SCHWARTZ-

DU MONT©
MOBILE COMMUNICATIONS

DH300
State of California
P.O.# 45467   June 30, 1972
Dept. of Conservation

INSTRUCTION MANUAL

DU MONT VHF-FM HAND HELD SOLID STATE PORTABLE

DH300
DH300H
DH300M

DU MONT MOBILE COMMUNICATIONS

a division of HAMMARLUND

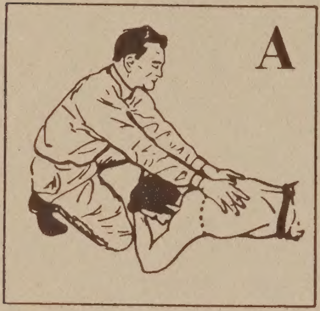
20 Bridge Avenue
Red Bank, New Jersey 07701

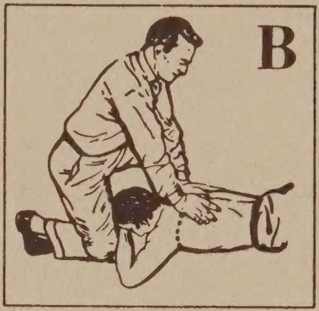
WARNING

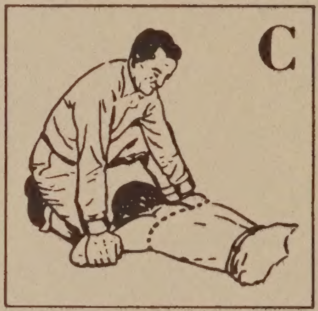
ELECTRICAL OR MECHANICAL SERVICING OF THIS EQUIPMENT SHOULD BE ATTEMPTED ONLY BY QUALIFIED TECHNICAL PERSONNEL AUTHORIZED FOR SUCH WORK. OPERATION OF THIS EQUIPMENT INVOLVES THE USE OF VOLTAGES WHICH MAY BE DANGEROUS TO LIFE.

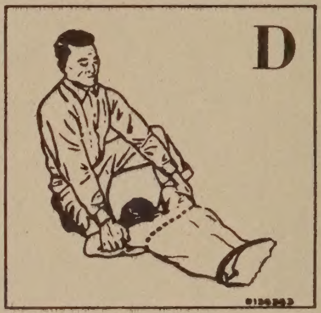
FIRST AID IN CASE OF ELECTRIC SHOCK

1. PROTECT YOURSELF with dry insulating material.
2. BREAK THE CIRCUIT by opening the power switch or by pulling the victim free of the live conductor. DON'T TOUCH THE VICTIM WITH YOUR BARE HANDS until the circuit is broken.
3. START ARTIFICIAL RESPIRATION IMMEDIATELY, SECONDS COUNT. Do not wait to look for help, to loosen clothing, to warm the victim, or to apply stimulants.









4. LAY VICTIM ON HIS STOMACH, preferably with head downhill.
5. CHECK MOUTH FOR OBSTRUCTIONS, remove foreign objects, pull tongue forward.
6. PLACE VICTIM'S FOREHEAD on his crossed hands, face down.
7. KNEEL AT VICTIM'S HEAD on either knee. See (A)
8. PLACE HANDS, fingers spread with thumbs about two inches apart, heels of hands below line connecting armpits. See (A)
9. WITH ELBOWS STRAIGHT, ROCK FORWARD slowly until arms are vertical. See (B) Do not apply more than 35 pounds pressure.
10. ROCK BACK SLOWLY to release pressure.
11. GRASP VICTIM'S ARMS just above elbows and continue backward. See (C)
12. LIFT ARMS until tension is felt. See (D)
13. LOWER ARMS to complete the cycle.
14. AFTER TWO SECONDS, START AGAIN with step 6.
15. REPEAT THE CYCLE 12 to 15 times per minute.
16. WHILE ARTIFICIAL RESPIRATION IS CONTINUED, HAVE SOMEONE ELSE:
    (a) Loosen the victim's clothing. (b) Summon medical aid.
    (c) Keep the victim warm.
17. DON'T GIVE UP. Continue without interruption until the victim is breathing without help or is certainly dead.

    Four hours or more may be required.
18. REMAIN IN POSITION after victim revives. Be ready to resume artificial respiration if necessary.
19. DO NOT GIVE LIQUIDS WHILE VICTIM IS UNCONSCIOUS.

VHF-FM

HAND HELD

TWO-WAY RADIO

2.2W RF Power
132-174 MHz
SOLID STATE

A complete receiver - transmitter, fully compatible with all high-band VHF-FM two-way radio communications systems. This extremely rugged radio operates anywhere to provide direct voice contact with base stations, mobile units, and other portable transceivers. Plug in modules provide maximum reliability in operation, plus minimum maintenance down time.

9013-06-00001
ISSUE 1
MAY, 1972

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SECTION I SPECIFICATIONS

1.1 General

Frequency Range	132-174 MHz
Power Supply	Nickel-Cadmium Rechargable Battery Pack Mercury Battery Pack
Battery Drain Standby	4.6 ma Nominal (15.0 V)
Receive	87 ma Nominal (15.0 V)
Transmit	400 ma Nominal (15.0 V)
Battery Life Based on 10% Xmit, 10% Receive, 80% Standby	10 hours between recharging with Nickel-Cadmium Battery Pack 48 hours with Mercury Battery Pack
Dimensions	1-3/4 x 3-3/8 x 8-1/16 inches
Weight	30-39 oz. (with certain accessories)
Service	By interchange of plug-in block modules

1.2 Transmitter

RF Output	*2.2 watts @ 15V (1.8 watts/ Mercury Battery)
Frequency Stability	± .0005% -30°C to +60°C (+25°C Ref)
Modulation	± 5kHz, Narrow Bank - ±15kHz, Wide Band
Crystal Multiplication	18 Times
Spurious and Harmonics	More than 47 db below carrier level
FM Hum and Noise	At least 50 db below 2/3 of rated system deviation
Audio Response	+1, -3db of Standard EIA 6 db/octave pre-emphasis characteristics from 300 to 3000 Hz
Audio Distortion	6% at 2/3 rated system deviation with 1000 Hz modulating signal

1.3 Receiver

Modulation Acceptance	± 5 kHz min. Narrow Band ± 15 kHz min. Wide Band
Sensitivity	Less than 0.35 microvolt: 12db SINAD method Less than 0.5 microvolt: 20db quieting method
Spurious and Image Rejection	At least 70 db below carrier
Noise Squelch Sensitivity	Less than .25 microvolts
Audio Output	750 milliwatts to speaker at less than 10% dist.
Frequency Stability	± .001% -30°C to +60°C (+25°C ref)
Selectivity	80 db down at adjacent channels for 20 db quieting

*Models are available with 2.2 or 4 watts RF output. For maritime use, a 2.2 watt model with a switch for 1 watt operation is available.

Specifications Subject to Change Without Notice.

SECTION II OPERATING INSTRUCTIONS

1. Turn the OFF-V-ON knob to its extreme counter-clockwise position. A slight click should be heard or felt.

2. Insert a known good battery. The battery pack is designed so that it cannot be connected with the wrong polarity. To install,

   a. open release bar,

   b. slide small end of keyway on the end of the battery pack into the wide end of the battery receptacle on the transceiver,

   c. lock the battery by pressing the release bar until it is flush with the case in the front.

3. Pull the collapsible antenna out to its maximum length. The antenna must be fully extended for proper receiver or transmitter operation.

> CAUTION
>
> Although your transceiver incorporates a current limiting device to protect the RF final, prolonged transmitting without the antenna extended could cause damage.

4. Preset all controls as follows:

   a. Rotate the SQUELCH control fully counter-clockwise.

   b. If unit is provided with the external "M" option, set the EXT switch so the switch handle is away from the EXT label. This switches in the internal microphone and speaker.

5. Rotate the OFF-V-ON control clockwise past "click" point to about one-half rotation. A fairly loud amount of noise should be heard.

6. Rotate the SQUELCH control clockwise until noise is stopped. Even in the maximum clockwise position all signals with 25 db signal-to-noise ratio or more will be heard. If squelch burst is objectionable the squelch can be turned clockwise until the burst disappears.

   When tone squelch is provided the noise squelch is defeated. A green monitor button is provided at the bottom of the push-to-talk switch to defeat the tone squelch and allow the noise squelch to function.

7. The OFF-V-ON control can be set for the desired listening level.

8. To transmit, hold the transceiver so that the speaker grille is approximately two inches from your face and speak in a normal tone while pressing the push-to-talk (PTT) lever-bar on the side of the case. Release the lever-bar-immediately after speaking so that a reply can be heard.

9. If the radio has the external "M" option, a connector and speaker switch is provided. The microphone and PTT functions of the external unit operate just by plugging in. The speaker is switched over manually, however, by moving the "EXT" switch toward the EXT label.

10. If the radio is provided with tone-coded squelch (CTSS), a disable toggle switch is provided on the top panel marked "TONE". A monitor button on the push-to-talk lever switches the receiver to normal noise squelch so the channel can be monitored before transmitting. The tone squelch circuit contains a tone generator which automatically transmits a selected tone signal which activates other receivers similarly equipped. Your receiver will remain quiet and immune to other signals until activated by a tone from a transmitter in your system. When the "TONE" switch is "OFF", tone for receive and transmit is disabled.

11 TO RECHARGE THE NICKEL-CADMIUM BATTERY PACK, USING THE MODEL 152 (120/240 V) BATTERY CHARGER: Drop the battery pack alone or still attached to the transceiver into the well of the charger. Set the charger switch to FULL. When the battery is inserted the white indicator light will glow assuring you that charging contact has been made. The battery only makes contact when inserted with the front of the battery facing forward to insure charging in the correct polarity. If indicator light does not come on, turn battery around.

A completely discharged pack requires 14 to 16 hours recharging time to restore it to full charge if the FULL position is used. A partially discharged pack or one whose state of charge is unknown can be recharged for 16 hours or more safely. A battery may be left on FULL charge for periods up to a week without damage.

When fully charged either remove for use or place the switch in the TRICKLE position. Eight days are required to fully recharge a discharged battery if the TRICKLE position only is used. The battery can be safely left on trickle charge indefinitely.

12 TO RECHARGE THE NICKEL-CADMIUM BATTERY PACK USING THE MODEL 154 BATTERY CHARGER: Drop the battery pack alone or still attached to the transceiver into the well of the charger. When the battery

is inserted correctly with the front of the battery facing forward, the indicator light will glow indicating charging contact. The 154 charger will deliver a rate of charge commensurate with the state of charge of the battery and taper to a point that will not damage the battery even if left on charge for extended periods of time. A completely discharged battery can be recharged in 12 to 14 hours. This charger will recharge two batteries simultaneously. The indicator lamps show the relative state of the battery's charge by the degree of brilliance since the lamp is in series with the charging circuit. On a fully charged battery the lamp will be relatively dim.

SECTION III BATTERIES -- GENERAL INFORMATION

NICKEL-CADMIUM: The nickel-cadmium rechargeable battery provides a reliable source of power over a wide range of operating environments The cells within the pack are sealed and require no maintenance Long periods of storage in either a charged or uncharged state will not adversely affect the battery pack. Under normal conditions of intermittent service and operation, several years of life can be expected from nickel-cadmium batteries. Charge/discharge cycle life is normally in excess of 300

There are a few precautions which should be well understood if optimum performance and maximum life is to be realized from rechargable nickel-cadmium batteries

1. These batteries have low internal resistance and are capable of high discharge rates. Do not short circuit the battery as high temperatures, produced by the heavy current flow, can damage the cells.

2. Nickel-cadmium batteries will operate in temperatures ranging from -40°F to +140°F, although some deterioration characteristics will occur at the temperature extremes. The charging environment should be within the temperature range of +32°F to +113°F as extended overcharging at high and low temperature extremes will adversely affect battery life.

3 Over a period of time, nickel-cadmium batteries will self-discharge When placing batteries into service, be certain they are fully charged It is recommended that a planned routine be developed to assure a balance between radio operating time and available time for recharging Take into consideration any unusual operating requirements which may alter the normal battery life cycle Useful life has been defined as the time required for transmitter output to drop to 50% of the rated power at 15 volts. All value shown in this manual are averaged figures based on a 10-10-80 duty cycle.

Measuring the voltage is not a satisfactory method of determining the state of charge of nickel-cadmium batteries. During discharge, the terminal voltage is essentially flat at approximately 15 volts until the discharged state is reached. At this point, an abrupt drop to 12 volts or less will be observed under transmit load conditions.

MERCURY: Mercury batteries are characterized by relatively constant and long amperehour capacity. They are not rechargeable Mercury batteries will operate in temperatures somewhat higher than those recommended for the nickel-cadmium types. However, at about 40°F a severe loss of capacity occurs.

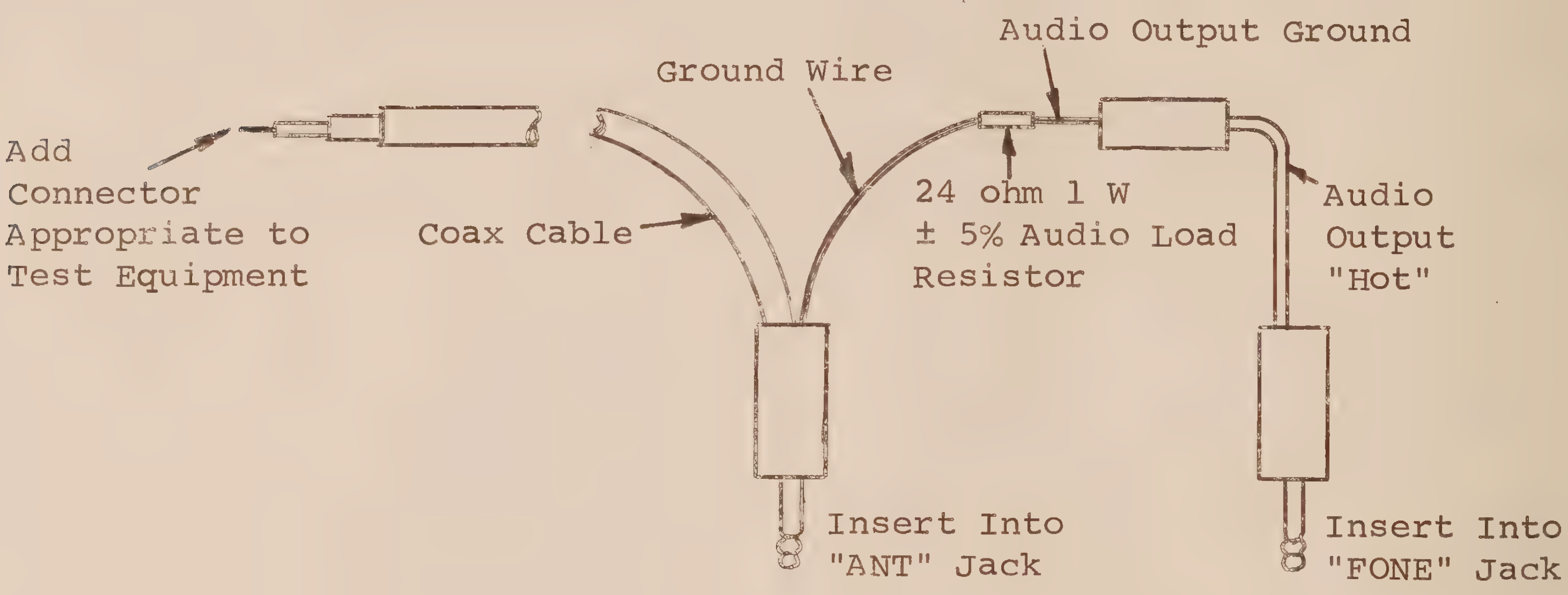
Mercury batteries are not suitable for applications requiring a high rate of discharge; therefore, this type is not recommended for use with 4-watt transceiver models.

For applications which may utilize the desirable characteristics of both battery types, magazine cases are available which will accept pack type mercury batteries, as well as, rechargeable nickel-cadmium packs.

SECTION IV PERFORMANCE CHECK PROCEDURE

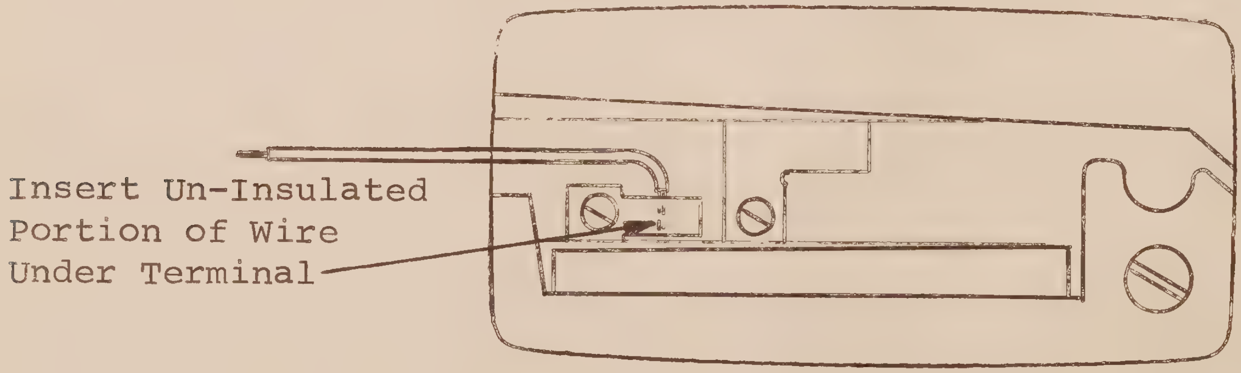
This is a test procedure to verify proper operation without opening the case of your transceiver.

All tests are made with a double plug adaptor as shown below. This adaptor is a part of test kit P/N 9013-12-00006, (see the accessories section of this book). The plug with co-axial cable is inserted into the antenna (ANT) jack on the top of the transceiver and the other plug is inserted into the earphone (FONE) jack.



Insertion of these plugs will automatically disconnect the internal antenna and internal loud speaker. The resistor will properly load the receiver audio circuit.

Battery voltage is measured by connecting a voltmeter negative terminal to the audio output ground terminal shown above and connecting the positive terminal by use of a small insulated wire (#22 or smaller gage) as shown below.



This wire will be between the transceiver and the battery pack. The wire will emerge through a very small slot inside the grip portion of the clamp lever. Attach this wire only for those tests where required. Do not allow the other end of this wire to short to the metal portions of the transceiver.

4.1 Transmitter Tests:

1. RF OUTPUT: Connect the coaxial cable to an RF wattmeter such as a BIRD termaline type. Connect a DC voltmeter so as to observe battery voltage. Operate transmitter by turning on switch combined with volume control and pressing push-to talk switch. Output should be the full rated wattage with a battery voltage of 15 volts after 15 seconds of operation.

2. FREQUENCY STABILITY: Couple RF energy from the FR wattmeter into a frequency counter and observe the frequency. The accuracy of the time base generator of the counter must be considered in interpreting the results indicated. Depending on the equipment used, this may cause an error of 0.2 to 175 cycles at high band frequencies for counters within specifications.

3. MODULATION: The modulation limiter control is factory set so that the peak amplitude of a strong 1000 Hz audio signal does not exceed ±5 KHz deviation. Either a Radio Specialties FM Deviation Meter type 1163 (which includes an oscilloscope display) or a calibrated oscilloscope connected to a meter type deviation measuring equipment should be used. With the transmitter adjusted in this manner, it may not always be possible to observe full deviation indication on meter type equipment using loud voice modulation into the internal microphone. If the deviation sensitivity is checked using a signal generator and without the microphone in the circuit, a 5000 ohm resistor must be used in series with the generator to simulate the microphone.

4.2 Receiver Tests:

For receiver tests the coaxial cable supplied with the test adaptor is connected to the output of an FM signal generator. Said generator should have a 50 ohm output impedance. All signal levels quoted in the specifications in this manual are actual input voltages, often referred to as "closed circuit" voltages. Such levels expressed in microvolts are one-half of the corresponding open circuit microvolts. All receiver specifications are applicable to a battery voltage of 15 volts.

1. SENSITIVITY (QUIETING): For this test the volume control is adjusted so that with no RF input signal and with the squelch control in the maximum counter-clockwise position, the audio output (as indicated on a VTVM connected across the 24 ohm resistor furnished in the test adaptor) is 187.5 milliwatts (1/4 of rated output). Unmodulated RF is fed into the receiver in the center of the receiver pass band so as to quiet the audio output by 20 db. The battery voltage is not to vary during this test.

2. SENSITIVITY (SINAD): This measurement referred to in EIA specifications as useable sensitivity requires a distortion meter and is performed with the squelch control fully counter-clockwise and the volume control set so that a strong signal modulated with 2/3 rated deviation at 1000 Hz produces 750 milliwatts audio output. In making this measurement the signal generator must be in the center of the receiver band pass. This tuning, however, is normally not critical. The amount of audio output at this sensitivity level will always exceed the 50% of rated audio level as required in the applicable EIA specifications.

   The Sinad sensitivity corresponds to the signal generator level required to produce a 12 db ratio on a harmonic distortion meter when switching from full output to that with the 1000 Hz signal removed. Expressed in a formula:

$$\frac{\text{Signal (1000Hz)} + \text{Distortion} + \text{Noise}}{\text{Distortion} + \text{Noise}}$$

3. SQUELCH SENSITIVITY: With no RF input, the squelch control is rotated clockwise until the output noise is reduced 40 db or more. A signal generator with 1000 Hz modulation producing 2/3 rated deviation is connected and is increased until the squelch opens and produces continuous audio of at least 75 milliwatts. The battery voltage must remain constant during this test.

4. RATED AUDIO OUTPUT: The AC voltage across the external 24 ohm resistor when the transceiver is delivering 750 milliwatts at 1000 Hz will be 4.24 volts.

For general servicing and alignment, a list of test equipment is shown below. This listing is typical and equivalent models may be used.

1. Wattmeter, Bird Model 43 with 5B plug-in element and Model 8130 coax resistor.
2. VTVM, RCA Model WV-98C with WG-200D and WG-301A probes.
3. Frequency counter, HP Model 5245 L with 5253B converter.
4. Audio oscillator, HP Model 204C.
5. Signal generator, Marconi Model TF-1066B.
6. FM deviation meter, Radio Speciality.
7. Distortion analyzer, HP Model 331A.
8. Power supply, 0-15 VDC @ 2A or higher.

SECTION V DISASSEMBLY

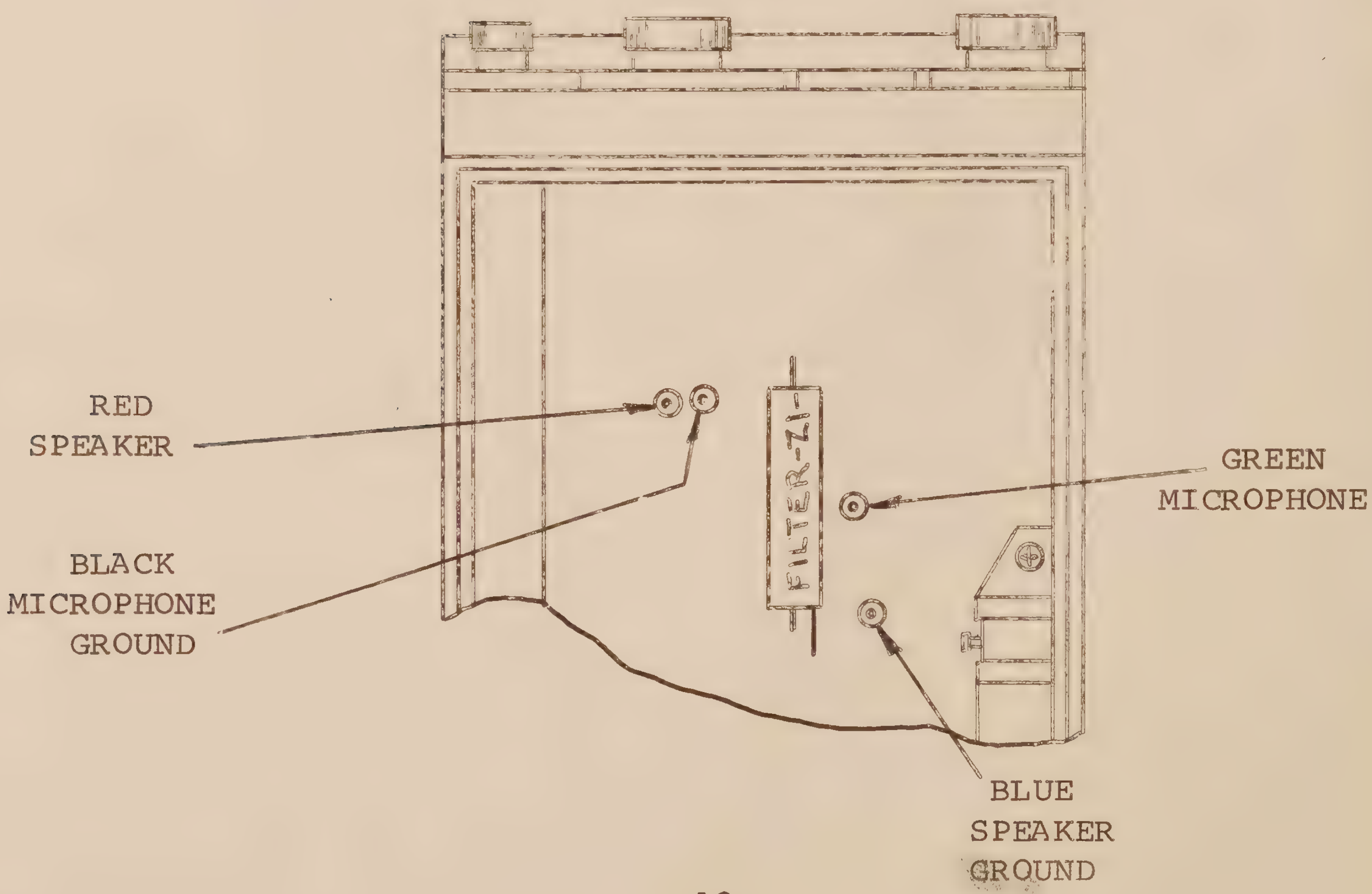
Remove the rear cover by loosening the four screws on the metal back plate. These screws are "captive" and need not be completely removed. There are no internal components or connections associated with this cover. However, this cover does have a label showing the serial number, model number and operating frequency. For this reason, rear covers MUST NOT BE MIXED between radios.

Note that once the rear cover is removed, the front cover is loose and can be removed. The speaker and microphone are mounted to the front cover and internally connected by individual pin-plugs to the printed circuit board. In event these pin-plugs are disconnected, color coding on the radio and the figure below will aid in re-assembly.

During re-assembly, do not allow the four speaker and microphone leads to be pinched under the edge of the cover.

CAUTION

Verify that radio has been turned OFF before removing covers.



SECTION VI REPAIR BY MODULE SUBSTITUTION

This method of trouble shooting requires kit of spares or second identical operative transceiver. Test equipment is not usually required provided the tunable modules, previously aligned to the operating frequency, are on hand.

It will be noted that some modules have a code letter stamped on one side of the case. These codes relate to manufacturing revisions. In general, interchangeability is not involved regardless of the revision level. Exceptions are listed with the module chart on a following page of the manual.

Because the transmitter and receiver portions of the transceiver are isolated circuits, it is unlikely both could be inoperative for any other reason than battery troubles. Listed below are suggested procedures and some notes regarding the substitition of modules.

6.1 Transmitter Difficulties

1. If no RF output on any channel:
   (a) Substitute modules in the following sequence: Nos. 14, 13, 12, 11, 10, and 9.

   If a substitute module does not restore operating, replace it with the original before progressing to the next one. This is very important because only the original modules may be properly tuned. If the substitute modules 10, 11, 12, and 13 are not tuned on or near the frequency of the radio being serviced, full RF output power will not be obtained even when the defective module is replaced. When this happens, retune the replacement module first. It may be necessary to reset the RF level control located within module No. 14. Refer to alignment instructions.

   (b) Substitute the relay. A partial check for defective contacts can be made by turning the relay end-for-end. The DPDT relay connections to the base are symmetrical.

   (c) In single channel equipment, substitute the applicable crystal.

2. No RF output on some but not all channels of multi-channel transmitters:
   (a) Swap crystals to isolate crystal and circuitry problems.

   (b) Verify that the multi-channel plug-in printed circuit board is firmly seated and that no electrical shorts have developed.

3. Proper RF output with less than normal or no modulation:
   (a) Substitute module No. 9.

6.2 Receiver Difficulties

Preset the OFF-V-ON control to a mid-position, the SQUELCH control to the maximum counter-clockwise position, and other optional control per paragraph 4 of the OPERATION section of this manual.

1. For no audio output or very little noise.
   (a) Check speaker circuit. Verify that speaker is not defective and that plugs and connections are secure.

   (b) Check that the push-to-talk switch is not binding and holding the transmitter on.

   (c) Substitute modules in the following sequence: 8, 7, 6, and 5.

2. Normal noise but no signal can be received:
   (a) Check that the crystal is properly seated in its socket and the channel selector switch (if provided) is properly set.

   (b) Substitute modules in the following sequence: 3 (may require retuning), 4, 2 and 1.

3. Poor sensitivity (receives only strong signals or excessive noise on desired signals):
   (a) Check for proper antenna and antenna jack connections.

   (b) Substitute modules in this sequence: 1, 2, 4, 5, 6, 7 and 3.

   (c) Substitute relay (or turn existing relay end-for-end).

4. Faulty squelch operation (receiver performs properly otherwise):
   (a) Substitute modules in this sequence: 7, 6, 8, and 5.

NOTE: Automated production methods are utilized during manufacture of PBC modules. Successive assembly operations prevent convenient dis-assembly. Unsoldering the module printed circuit board from the case causes solder to flow that holds internal R.F. shields and module seats. This can cause cold solder joints, component failure and electrical shorts. Internal repairs on modules are not recommended.

SECTION VI - continued

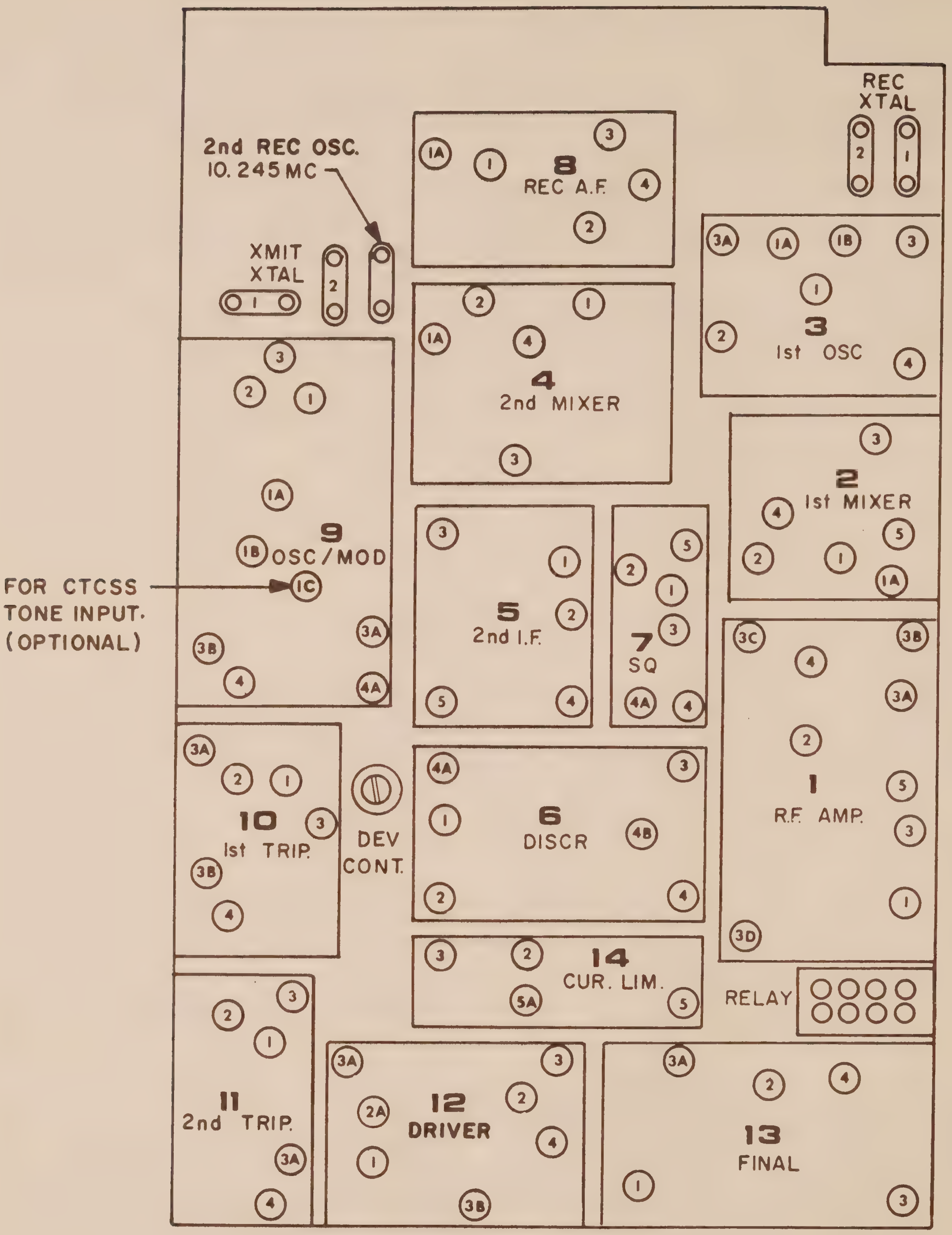
MODULE CHART - HIGH BAND

The purpose of this chart is to show what modules have been and can be used in the high-band model.

MODULES 2.2 Watt	132-150.8MHz	150.8-162MHz	162-174 MHz
Module #1, RF Amplifier	9013-01-00024	9013-01-00005	9013-01-00031
Module #2, First Mixer	→	→	9013-01-00006
Module #3, First Osc.	→	→	9013-01-00007
Module #4, 2nd Mixer & Osc.	→	→	9013-01-00008
Module #5, Second IF	→	→	9013-01-00009
Module #6, Discriminator	→	→	9013-01-00010
Module #7, Squelch	→	→	9013-01-00011
Module #8, Receiver audio	→	→	9013-01-00012
Module #9, Modulator	→	→	9013-01-00013
Module #10, First Tripler	9013-01-00025	→	9013-01-00014
Module #11, Second Tripler	9013-01-00026	→	9013-01-00015
Module #12, Driver	9013-01-00027	9013-01-00016	9013-01-00028
Module #13, RF Final	9013-01-00029	→	9013-01-00017
Module #14, Limiter	→	→	9013-01-00018
MODULE CHANGES FOR 4 - WATT TRANSMITTER			
Module #13, RF Final	9013-01-00032	9013-01-00021	9013-01-00030
Module #14, Limiter	→	→	9013-01-00033

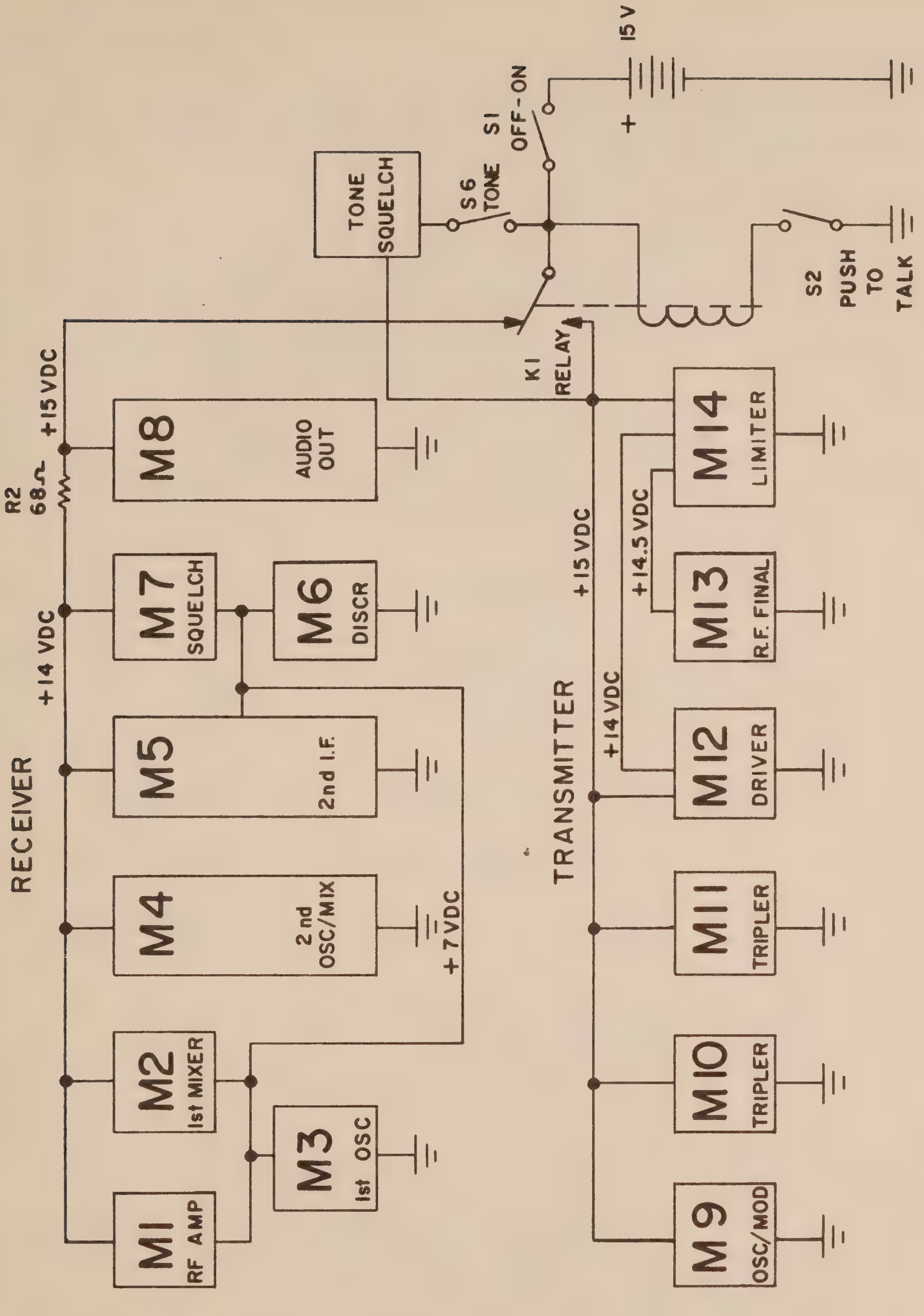
MODULE CHART

TABLE 1



MODULE SOCKET IDENTIFICATION

FIGURE 1



BATTERY VOLTAGE DISTRIBUTION

FIGURE 2

SECTION VII CRYSTAL SPECIFICATIONS

For the convenience of using any of the many manufacturers of quartz crystals, listed here are the complete specifications of the crystals used in your transceiver:

2304-01-00029- Transmitter Crystal - 132-174 MHz

Military type CR-78/U (parallel resonant) except:
Case: HC-25/U except pin length of .187 ± .010 inch
Frequency: 7.333333 to 9.666667 MHz (1/18 of operating frequency, calculate to six decimal points)
Load Capacity: 20pF
Frequency Tolerance at 25°C: ± .002%
Temperature Characteristic: +.0005% maximum shift from frequency at +25°C over range -30°C to + 60°C.

2305-01-00097- Receiver First Oscillator Crystal - 132-174 MHz

Military type CR-77/U (series resonant) except:
Case: HC-25/U except pin length of .187 ±.010 inch
Frequency: 46.700000 to 54.433333 MHz

Below 150.8 MHz, calculate as follows to six decimal points:

$$\text{Crystal Freq.} = \frac{\text{Operating Freq.} + 10.7\ \text{MHz}}{3}$$

150.8 to 174 MHz, calculate as follows to six decimal points:

$$\text{Crystal Freq.} = \frac{\text{Operating Freq.} - 10.7\ \text{MHz}}{3}$$

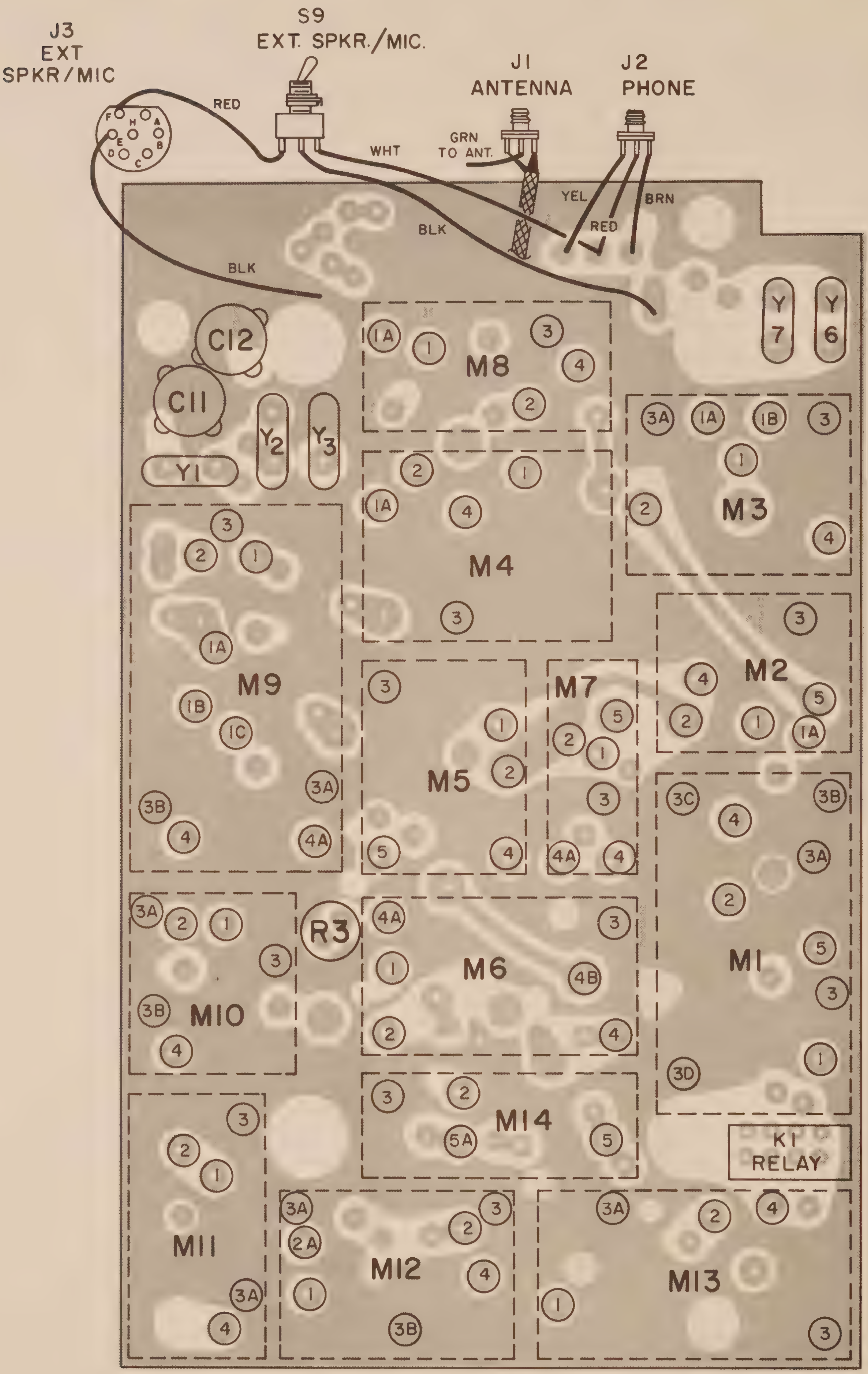
Dissipation: 1 milliwatt maximum
Frequency Tolerance at 25°C: ± .001%
Temperature Characteristic: ± .0015% max. shift from frequency at + 25°C over range -30°C to + 60°C.

2305-01-00096- Receiver Second Oscillator Crystal

Military type CR-78/U (parallel resonant) except:
Case: HC-25/U except pin length of .187 ± .010 inch
Frequency: 10.245 MHz ± .002% at +25°C
Load Capacity: 68pF
Temperature Characteristic: ± .002% maximum shift from frequency at +25°C over range of - 30°C to + 60°C.

NOTE: Channel spacing should be selected to be within a maximum of 1% at the carrier frequency between the lowest and the highest channel.

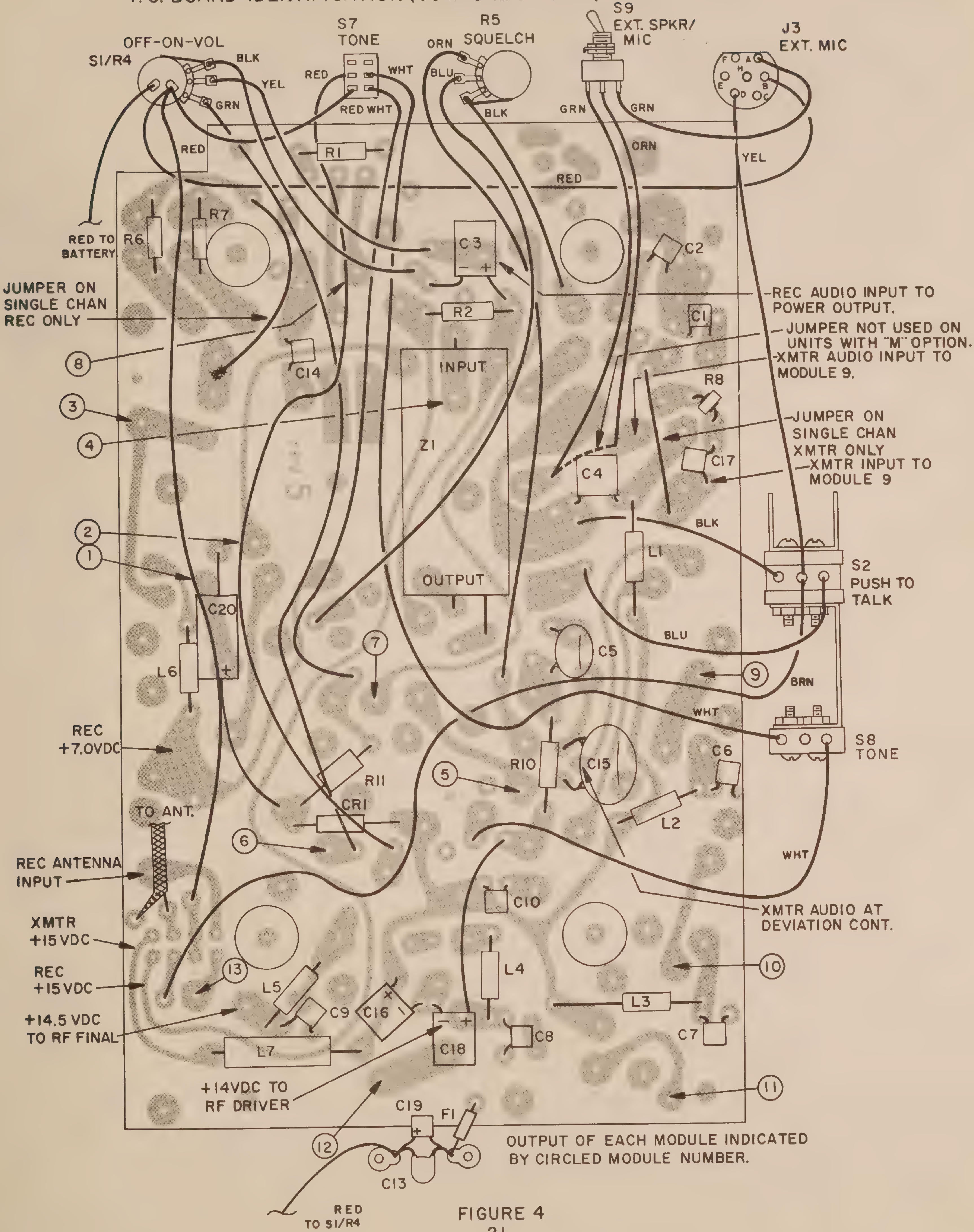
P.C. BOARD IDENTIFICATION (MODULE SIDE)....



NUMBERS WITHIN MODULE OUTLINES INDICATE MODULE PIN NUMBERS

FIGURE 3

P.C. BOARD IDENTIFICATION (COMPONENT SIDE)



OUTPUT OF EACH MODULE INDICATED BY CIRCLED MODULE NUMBER.

FIGURE 4

SECTION VIII TRANSMITTER SIGNAL TRACING

8.1 All RF and DC measurements are made with VTVM having the standard 11 megohm input resistance using RF or DC probes as appropriate. Refer to pages 21 for test point locations.

RF Tracing	RF	DC
1. Measure level of crystal input to module 9 at pin 1A. Check each crystal on multi-channel radios.	2.5V	
2. Measure output of module 9.	0.4V	+1.7V
3. Measure output of module 10.	1.4V	-0.05V
4. Measure output of module 11.	1.5V	-0.05V
5. Measure output of module 12.	1.7V *2.0V	-0.8V *-0.2V
6. Measure output of module 13.	10.0V *14.0V	
7. Check power into external 50 ohm co-axial load thru ANT jack using in-line wattmeter.	2.2Watts *4.0Watts	

* Nominal values for 4 watt models.

AF TRACING

1. Set audio oscillator to approximately 1 kHz and connect to microphone input or place separate loudspeaker connected to audio oscillator in front of the microphone. Set level of module 9 input to 5MV.

2. Check level at the slider of the deviation control. The reading should be .13 volts.

NOTE: When using the signal tracing method to localize problem areas, it is recommended that a regulated 15 volt external power supply be used.

RECEIVER SIGNAL TRACING

8.2 All RF and DC measurements are made with VTVM having the standard 11 megohm input resistance, using RF or DC probes as appropriate. Refer to pages 21 and 23 for locations of test points and printed circuit lands which are convenient reference points for measuring output voltage.

RF TRACING	RF	DC
1. Measure D.C. level on the oscillator test point on module 3.		1.18V
2. Measure output of module 3.	0.14V	
3. Measure output of second oscillator at pin 1A of module 4 or at the pin of the 10.245 MHz crystal.	0.73V	1.25V
4. Measure output of module 1 with on-channel signal set to 35 milli volts.	0.10V	14.0V
5. Measure output of module 2 with on-channel signal set to 3000 microvolts.	0.17V	
6. Measure output of module 4 with on-channel signal set to 1000 microvolts.	0.20V	
7. Measure output of filter Z1 with on-channel signal set to 1000 microvolts.	0.22V	
8. Measure output of module 5 with on-channel signal set to 10 microvolts.	0.30V	0.2V

AF TRACING	AF	DC
1. Measure output of module 6 with on-channel signal set to 1.0 microvolt with 1000Hz modulation set for ± 3.3 kHz deviation.	0.03V	1.5V
2. Measure output of module 7 with signal as in step 1. With the signal removed and the receiver squelched, the output should drop to zero.		2.0V

3. Measure output of module 8 with signal as in step 1. The value shown (equivalent to 750 milliwatts) should be reached with the volume control in a middle position. 4.33V

NOTE: All voltage shown are averaged values. Variations of 15% are considered normal.

NOTES:

TRANSMITTER TUNING ADJUSTMENTS LOCATION

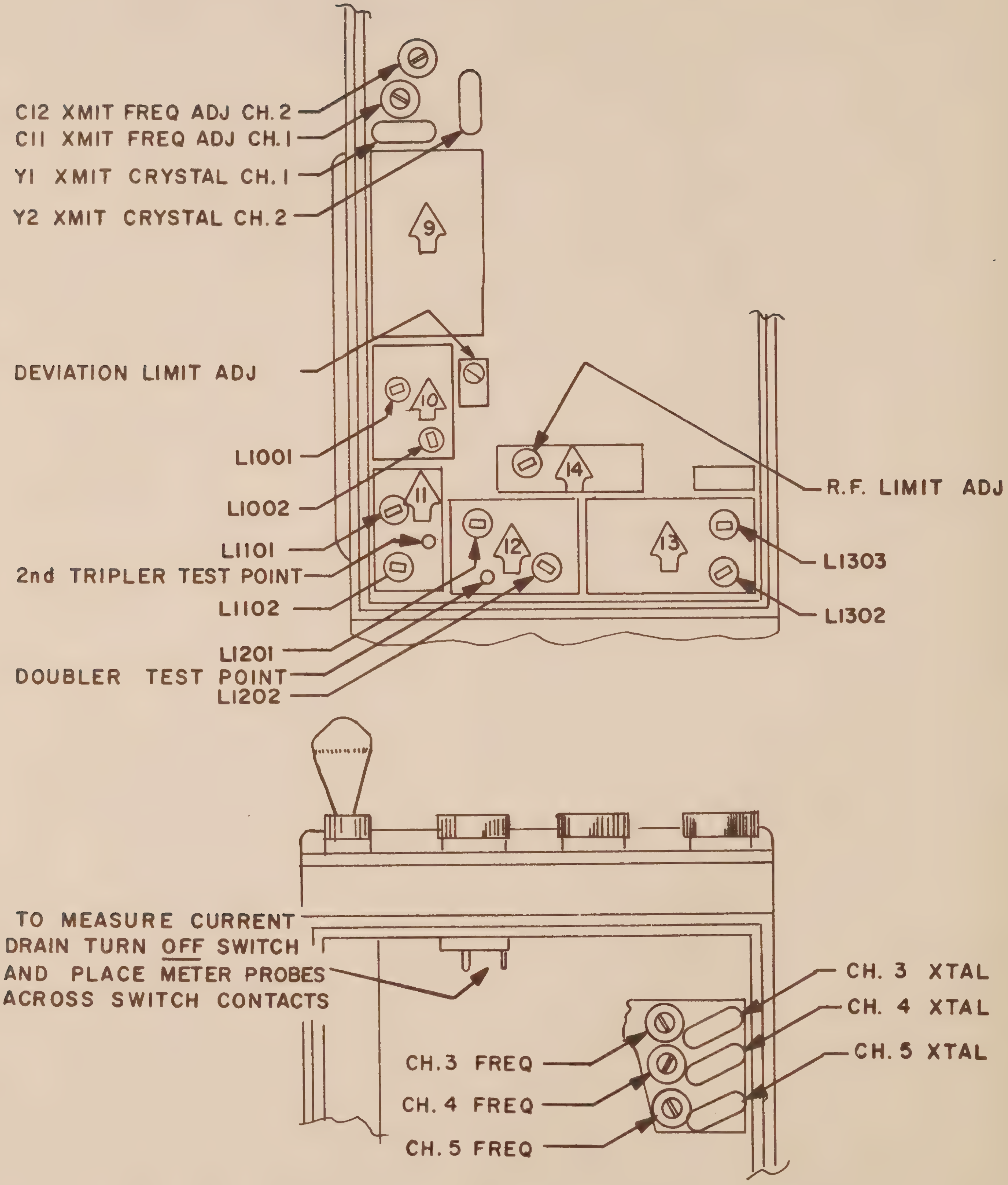


FIGURE 5

TRANSMITTER ALIGNMENT PROCEDURE

STEP		INDICATING METER	ADJUSTMENT TO BE MADE	NOTES
1	Xmtr without test point on #11 module	RF probe on VTVM connected to output module #10	L1002 for max. Repeat	
	Xmtr with test point on #11 module	50 uA or .25 V.D.C. Multimeter to test point on module #11 METER NEGATIVE TO GROUND	L1001 and L for max. L1101 for minimum. Repeat L1001 and L1002	
2	Xmtr with test point on #12 module	RF probe on VTVM connected to output module #11	L1101 and L1102 for max. Repeat	Do not retune L1001 and L1002 using meter indication of this step.
	Xmtr with test point on #12 module	50 uA or .25 V.D.C. Multimeter to test point on module #12 METER NEGATIVE TO GROUND	L1102 for max. L1201 min. L1101 for max. Repeat L1102 for max, L1201 for min.	Do not retune L1001 and L1002 using meter inducation of this step.
3	Xmtr without test point on #12 module	RF power output meter connected to RF load.	L1302, L1303, L1202 and L1202 for max. Repeat.	Adjust L1201 so that core is in center of range producing max. output.
	Xmtr with test point on #12 module	RF power output meter connected to RF load.	L1302, L1303, and L1202 for max. Repeat	
4	Repeat steps 1, 2, and 3			Omit this step for touch-up alignment.
5	Adjust RF power level	RF power output meter connected to RF load	"RF LIMIT ADJ." to the rated RF output. (Refer to specifications, see page #1 this manual) Readjust L1302, L1303 and L1202 for max. repeat.	If power output does not exceed rated power at full CCW position set RF limited adj. to position about 15° CCW from where power reduction begins
6	Tone squelch deviation	Deviation meter connected to load	"TONE DEVIATION ADJUST" located on tone squelch sub-assembly to ±500 to ±600 Hz deviation	This step for radios with tone squelch (C.T.C.S.S.) only
7	Voice deviation adjustment Disconnect mike, feed 0.1 V.A.C. at 600 Hz into mike input	Deviation meter connected to load	"DEVIATION LIMIT ADJUST" Control to ±5KHz (normal) or ±15 KHz (wide band) (see note #4 below)	Leave tone squelch on (if provided)
8	Frequency adjustment	Frequency meter connected to load	"CHAN 1 FREQ" to proper freq. within ±100Hz. Repeat for other channels, if any	No voice or tone squelch modulation

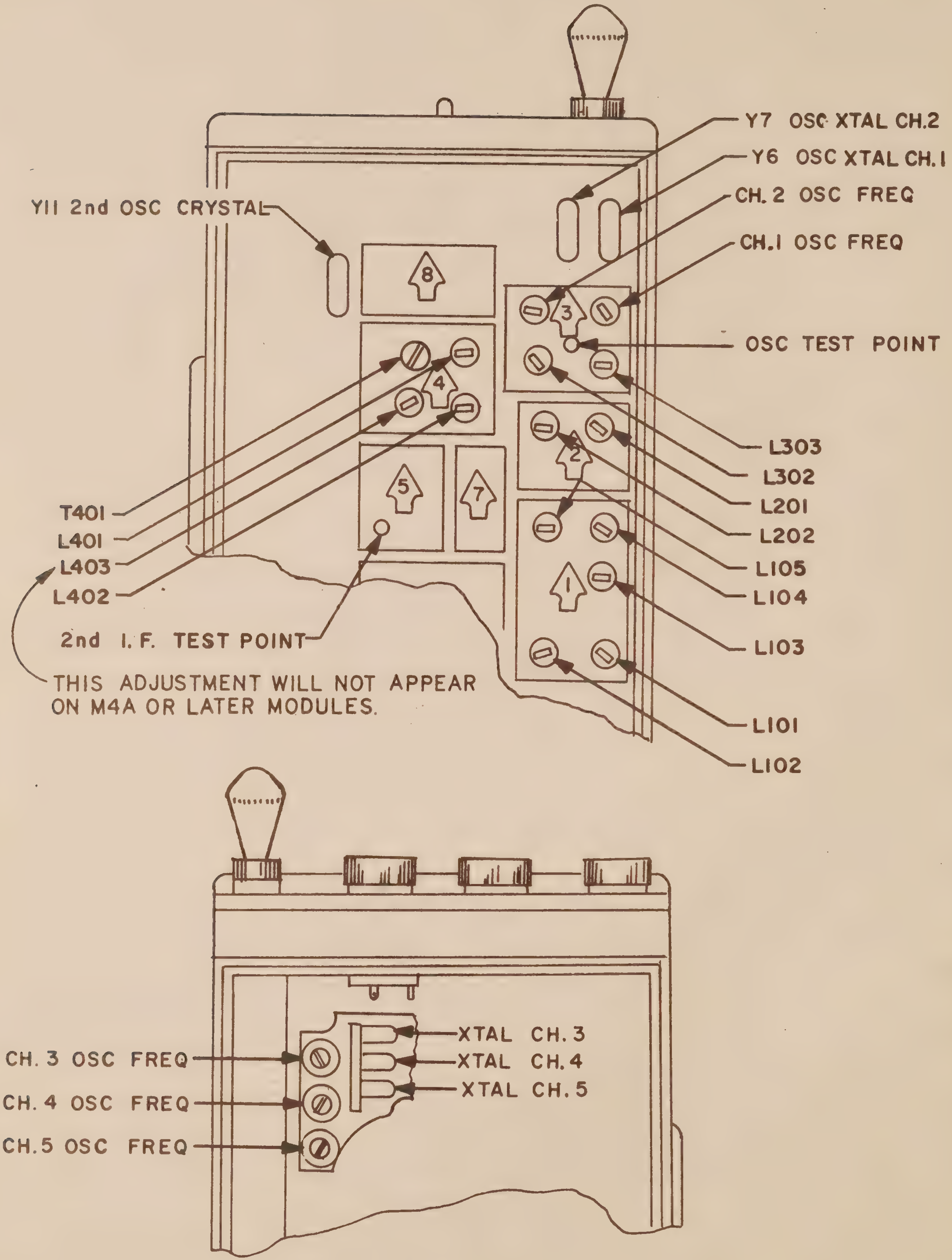
GENERAL NOTES

1. Battery supply voltage set at 15.0 volts for all steps.
2. Do not remove any modules while performing alignment.
3. It is vital that L1001 and L1002, be aligned only as instructed in Step 1. Do not adust while observing power output meter.
4. Wide band operation not available in 66-88 MHz models.

WARNING
F.C.C. Rules require the person adjusting this transmitter to hold a first or second class commercial license.

TABLE 2

RECEIVER TUNING ADJUSTMENTS LOCATION



THIS ADJUSTMENT WILL NOT APPEAR ON M4A OR LATER MODULES.

FIGURE 6

RECEIVER ALIGNMENT PROCEDURE

STEP	TEST EQUIPMENT AND CONNECTIONS		ADJUST	NOTES
	INPUT	OUTPUT		
1	None	DC VTVM probe or negative lead of 50 uA D.C. meter to test point on module 3. Other lead to ground.	Adjust L302 for maximum voltage. On high and mid-band radios only, adjust L303 for minimum reading.	Check each channel on multi -channel receivers. For receivers having widely spaced channel frequencies compromise tuning so that the widest spaced channels have equal meter readings.
2	Signal generator set to desired channel frequency connected to "ANT" jack.	DC VTVM probe to test point on module 5.	In order, L104, L105, L103, L102, L101, L201, L202, L401, L402, L403, T401. READJUST IF NECESSARY	Keep generator level set so that meter reads in the 0.3 to 0.5 volt range Adjust for maximum voltage
3	Same as Step 2	Same as Step 2	Fine adjustment of L101 and L102	Adjust for maximum quieting as noted on speaker.
4	1. Desired channel frequency from base station or signal generator set precisely on frequency; AND 2. 455 KHz loosely coupled in rear of filter	Listen for audio zero beat in speaker.	Adjust applicable "OSC FREQ " adjustment for each channel to obtain zero beat sound.	Frequency meter or frequency counter is recommended for exact adjustments

GENERAL NOTES

1. Use of power supply set at 15 volts is recommended.
2. Power must be turned off before removing or inserting modules.
3. There are no adjustments or test points for the pulse-averaging discriminator circuit used in this receiver.

TABLE 3

SECTION IX PROCEDURE FOR REPLACEMENT OF THE P.C. BOARD

NOTE: Should the printed circuit board become damaged to a point which requires its replacement, the manufacturer recommends the new part be a P.C. board sub-assembly with capacitors, inductors and resistors already installed. Transferring the small components to a bare replacement board cannot be recommended because of the high probability of damage to these parts in the process.

1. Remove modules, relay, filter, accessories and all crystals.
2. Unsolder ground wire from battery contactor to P.C. board.
3. Remove both wires from switch portion of the off-on-volume control.
4. Remove both wires from push-to-talk switch that operates the relay.
5. Disconnect three Fone jack wires at P.C. board end.
6. Disconnect volume and squelch wires at P.C. board end.
7. Loosen four nylon screws holding P.C. board.
8. Disconnect antenna jack coaxial cable at relay end. Pull coaxial cable from P.C. board.
9. Remove P.C. board.
10. Transfer wire remaining on P.C. board as required.
11. Replace using reverse procedure. As a wiring aid, refer to the pictorial view and P.C. board components identification which appears earlier in the manual.

REPLACEMENT OF THE EARPHONE AND/OR ANTENNA JACK

1. Loosen the particular jack from the control panel with use of the special spanner wrench provided in your transceiver service/test kit P/N 9013-12-00006.
2. Remove water sealing boot by "rolling" it back to an inside-out position.
3. Replace jack, adjust position and then tighten securely.
4. Resolder wires and carefully inspect wire position and solder joint.

5 Repostion water sealing boot carefully to insure a tight fit.

NOTE: In handling the jack do not exert pressure on that portion of the jack on the inside that contacts the tip portion of the mating plug. Excessive pressure can bend the normally closed contact and result in improper switching action.

SECTION X PARTS LIST

ITEM	DESCRIPTION	
C1	Capacitor, Fixed Cer Red Cap 22pF	1509-14-32012
C2	Capacitor, Fixed Cer Red Cap 22pF	1509-14-32012
C3	Capacitor, Tan Minitan 22uF	1539-01-00021
C4	Capacitor, Fixed Cer Red Cap .01uF	1509-11-52011
C5	Capacitor, Fixed Cer Disc .05uF	1509-01-01086
C6	Capacitor, Fixed Cer Red Cap .0022uF	1509-11-52006
C7	Capacitor, Fixed Cer Red Cap .001uF	1509-11-52003
C8	Capacitor, Fixed Cer Red Cap .001uF	1509-11-52003
C9	Capacitor, Fixed Cer Red Cap .001uF	1509-11-52003
C10	Capacitor, Fixed Cer Red Cap .0047uF	1509-11-52009
C11	Capacitor, Cer Variable 7-35 pF	1513-01-00024
C12	Capacitor, Cer Variable 7-35pF	1513-01-00024
C13	Capacitor, Fixed Cer. .1uF	1509-01-01088
C14	Capacitor, Fixed Cer Red Cap .0022uF	1509-11-52006
C15	Capacitor, Fixed Cer .1uF	1509-01-01088
C16	Capacitor, Tan. Minitan 22uF	1539-01-00021
C17	Capacitor, Fixed Cer Red Cap 10pF	1509-14-32008
C18	Capacitor, Tan. Minitan 33uF	1539-01-00022
C19	Capacitor, Tan. Minitan 22uF	1539-01-00021
F1	Fuse, Pigtail Type	5134-01-00102
J1	Miniature Phone Jack	2109-01-00013
J2	Miniature Phone Jack	2109-01-00120
K1	Relay	4516-01-00001
L1	Coil, Single Winding 10uH	1804-01-00120
L2	Coil, Single Winding 10uH	1804-01-00120
L3	Coil, Single Winding 4.7uH	1805-01-00151
L4	Coil, Single Winding 1uH	1805-01-00143
L5	Coil, Single Winding .1uH	1806-01-00200
L6	Coil, Single Winding 470uH	1802-01-00068
L7	Coil, Single Winding 4.7uH	1805-02-00137
Resistors are 1/4W, 5% unless otherwise specified		
R1	Resistor, 2.7	4702-02-00157
R2	Resistor, 68Ω	4702-02-00119
R3	Resistor, Variable 2KΩ	4734-01-00027
R4	Resistor, Variable 500K SPST (S1)	4735-01-08003
R5	Resistor, Variable 10KΩ	4735-01-00019
R6	Resistor, 1/8W, 5%, 8.2K	4729-01-00001
R7	Resistor, 1/8W, 5%, 8.2K	4729-01-00001
R8	Thermistor, 100Ω	4746-01-00003
R10	Resistor 180Ω	4702-02-00129
R30	Resistor, 33Ω 2W	4713-01-02002
Y1	Crystal, Transmit Subminiature	2304-01-00029
Y3	Crystal, Receiver, 2nd Oscillator	2305-01-00096
Y6	Crystal, Receiver Subminiature	2305-01-00097
Z1	Filter Ceramic	2725-01-00004

ITEM	DESCRIPTION	PART NUMBER
1.	Universal Leather Carrying Case	9013-01-00020
2.	Antenna Assembly	9013-03-00001
3.	Knob	2430-01-00004
4.	Knob, Insert	3124-01-00100
5.	Main Case	1458-01-00001
6.	Back Cover	1439-01-00068
7.	Front Cover	1439-01-00067
8.	Switch Actuator (main case)	2501-01-00004
9.	#6-32 Spanner Head Screw (switch actuator)	2873-24-00103
10.	Plug (Switch actuator)	3124-01-00102
11.	Plug (Fone & Ant)	3124-01-00101
12.	#¼-32 Slotted Retainer Nut (controls)	2897-54-00613
13.	Lock Lever	2413-01-00015
14.	Bent Spring Washer (Lock Lever)	2898-51-91033
15.	#8-32 Shoulder Screw (Lock Lever)	2873-54-00104
16.	Battery Contact (Positive)	2537-01-00057
17.	Battery Contact (Negative)	2537-01-00058
18.	Speaker	1310-01-00023
19.	Speaker Clamp	1450-01-00354
20.	Microphone	1307-01-00003
21.	Microphone Clamp	1450-01-00355
C20	Capacitor, Elec. 12.5UF, 25V	1515-02-04020
CR1	Diode, 1N277	4804-01-00003
R11	Resistor, 3.3K ± 10% ¼W	4702-01-00038

MODULE #1, R.F. AMP

ITEM	DESCRIPTION	PART NUMBER
C101	Capacitor, Red Cap 12pF	1509-14-32009
C102	Capacitor, Cer Red Cap 56pF	1509-14-32017
C103	Capacitor, Molder .43pF	1509-01-04102
C104	Capacitor, Cer Red Cap 12pF	1509-14-32009
C105	Capacitor, Cer Red Cap 56pF	1509-14-32017
C106	Capacitor, Disc .001uF	1509-01-01019
C107	Capacitor, Cer Red Cap 10pF	1509-14-32008
C108	Capacitor, Cer Disc .001uF	1509-01-01019
C109	Capacitor, Cer Disc .001uF	1509-01-01019
C110	Capacitor, Molded .22pF	1509-01-04100
C111	Capacitor, Cer Red Cap 10pF	1509-14-32008
C112	Capacitor, Cer Red Cap 10pF	1509-14-32008
C113	Capacitor, Cer Red Cap .001uF	1509-11-52003
CR101	Diode, 1N4148	4803-01-00003
J101	Connector, Male	2115-01-00004
J102	Connector, Male	2115-01-00004
J103	Connector, Male	2115-01-00004
J103A	Connector, Male	2115-01-00004
Jo13B	Connector, Male	2115-01-00004
J103C	Connector, Male	2115-01-00004
J103D	Connector, Male	2115-01-00004
J104	Connector, Male	2115-01-00004
J105	Connector, Male	2115-01-00004
L101	Coil, RF .125-.175	1806-01-00176
L102	Coil, RF .125-.175	1806-01-00176
L103	Coil, RF .125-.175	1806-01-00176
L104	Coil, RF .125-.175	1806-01-00176
L105	Coil, RF .125-.175 Tap	1806-01-00177
Q101	Transistor, 2N3399	4845-01-00005
R101	Resistor, 33K	4702-02-00183
R102	Resistor, 33K	4702-02-00183
R103	Resistor, 3.3K	4702-01-00159

MODULE #2, 1st MIXER

C201	Capacitor, Cer Red Cap 0.47uF	1509-11-52016
C202	Capacitor, Molded .47pF	1509-01-04103
C203	Capacitor, Cer Red Cap .001uF	1509-11-52003
C204	Capacitor, Cer Red Cap .047uF	1509-11-52016
C205	Capacitor, Molded .33pF	1509-01-04101
J201	Connector, Male	2115-01-00004
J201A	Connector, Male	2115-01-00004

ITEM	DESCRIPTION	PART NUMBER
J202	Connector, Male	2115-01-00004
J203	Connector, Male	2115-01-00004
J204	Connector, Male	2115-01-00004
J205	Connector, Male	2115-01-00004
L201	Coil, I.F.	1805-01-00018
L202	Coil, I.F.	1805-01-00018
Q201	Transistor 2N3399	4845-01-00005
R201	Resistor, 4.7K	4702-02-00163
R202	Resistor, 33K	4702-02-00183
R203	Resistor, 680Ω	4702-02-00143

MODULE #3, 1st OSCILLATOR

ITEM	DESCRIPTION	PART NUMBER
C301	Capacitor, Variable 7-35pF	1513-01-00024
C302	Capacitor, Variable 7-35pF	1513-01-00024
C303	Capacitor, Cer Red Cap .033uF	1509-11-6015
C304	Capacitor, Cer Red Cap 39pF	1509-14-32015
C305	Capacitor, Cer Red Cap 15pF	1509-14-32010
C306	Capacitor, Cer Red Cap 10pF	1509-14-32008
C307	Capacitor, Cer Red Cap 8pF	1509-14-32048
C308	Capacitor, Cer Red Cap 8pF	1509-14-32048
CR301	Diode, 1N4148	4803-01-00003
J301	Connector, Male	2115-01-00004
J301A	Connector, Male	2115-01-00004
J301B	Connector, Male	2115-01-00004
J302	Connector, Male	2115-01-00004
J303	Connector, Male	2115-01-00004
J303A	Connector, Male	2115-01-00004
J304	Connector, Male	2115-01-00004
L301	Coil, .76uH	1806-01-00212
L302	Coil, .76uH	1806-01-00212
L303	Coil, 4.7uH	1805-01-00151
L304	Coil, .56-1.0uH	1806-01-00172
L305	Coil, .14-.19uH	1806-01-00178
Q301	Transistor, RCA 40244	4847-01-00001
R301	Resistor, 390K	4702-02-00209
R302	Resistor, 2.2K	4702-02-00155
R303	Resistor, 22K	4702-02-00179
R304	Resistor, 100K	4702-02-00195

MODULE #4, 2nd MIXER

ITEM	DESCRIPTION	PART NUMBER
C401	Capacitor, Molded .22pF	1509-01-04100
C402	Capacitor, Cer Red Cap. .01uF	1509-11-52011

ITEM	DESCRIPTION	PART NUMBER
C403	Capacitor, Cer Red Cap .001uF	1509-11-52003
C404	Capacitor, Cer Red Cap 5pF	1509-14-32047
C405	Capacitor, Fixed Tan. 3.3 uF	1539-01-00009
C406	Capacitor, SM 250pF	1519-01-12006
C407	Capacitor, SM 68pF	1519-01-11006
J401	Connector, Male	2115-01-00004
J401A	Connector, Male	2115-01-00004
J402	Connector, Male	2115-01-00004
J403	Connector, Male	2115-01-00004
J404	Connector, Male	2115-01-00004
L401	Coil, I.F.	1805-01-00018
Q401	Transistor, MPS6512	4859-01-00008
Q402	Transistor, MPS6512	4859-01-00008
R401	Resistor, 33K	4702-02-00183
R402	Resistor, 18K	4702-02-00177
R403	Resistor, 47K	4702-02-00187
R404	Resistor, 3.3K	4702-02-00159
R405	Resistor, 2.2K	4702-02-00155
R406	Resistor, 1.5K	4702-02-00151
T401	Transformer, I.F.	1824-01-00006
T402	Transformer, I.F.	1824-01-00008

MODULE #5, I.F. AMP

ITEM	DESCRIPTION	PART NUMBER
C501	Capacitor, Cer Red Cap .001uF	1509-11-52003
C502	Capacitor, Fixed Tan. .1uF	1539-01-00011
C503	Capacitor, Fixed Tan. 3.3uF	1539-01-00009
C504	Capacitor, Cer Red Cap .001uF	1509-11-52003
C505	Capacitor, Fixed Tan. .1uF	1539-01-00011
C506	Capacitor, Cer Red Cap .001uF	1509-11-52003
C507	Capacitor, Fixed Tan. .1uF	1539-01-00011
C508	Capacitor, Fixed Tan. .22uF	1539-01-00021
C509	Capacitor, Fixed Tan. 1.0uF	1539-01-00010
C510	Capacitor, Cer Red Cap .001uF	1509-11-52003
CR501	Diode, 1N4148	4803-01-00003
CR502	Diode, 1N4148	4803-01-00003
CR503	Diode, 1N4148	4803-01-00003
CR504	Diode, 1N4148	4803-01-00003
CR505	Diode, 1N4148	4803-01-00003
CR506	Diode, 1N4148	4803-01-00003
CR507	Diode, 1N4148	4803-01-00003
CR508	Diode, 1N277	4804-01-00003
J501	Connector, Male	2115-01-00004
J502	Connector, Male	2115-01-00004

ITEM	DESCRIPTION	PART NUMBER
J503	Connector, Male	2115-01-00004
J504	Connector, Male	2115-01-00004
J505	Connector, Male	2115-01-00004
Q501	Tranasitor, MPS2925	4856-01-00001
Q502	Transistor, MPS2925	4856-01-00001
Q503	Transistor, MPS2925	4856-01-00001
R501	Resistor, 2.7K	4702-02-00157
R502	Resistor, 390K	4702-02-00209
R503	Resistor, 8.2K	4702-02-00169
R504	Resistor, 1.8K	4702-02-00153
R505	Resistor, 390K	4702-02-00209
R506	Resistor, 180Ω	4702-02-00129
R507	Resistor, 8.2K	4702-02-00169
R508	Resistor, 1.8K	4702-02-00153
R509	Resistor, 390K	4702-02-00209
R510	Resistor, 8.2K	4702-02-00169
MODULE #6, DISCRIMINATOR		
C601	Capacitor, SM 120pF	1519-01-11005
C602	Capacitor, SM 390pF	1519-01-12003
C603	Capacitor, Fixed Tan 3.3uF	1539-01-00009
C604	Capacitor, Cer Red Cap .0047uF	1509-11-52009
C605	Capacitor, Fixed Tan 10uF	1539-01-00008
C606	Capacitor, Cer Red Cap .001uF	1509-11-52003
C607	Capacitor, Cer Red Cap .01uF	1509-11-52011
C608	Capacitor, SM 68pF	1519-01-11006
C609	Capacitor, Cer Red Cap .001uF	1509-11-52003
CR601	Diode, 1N277	4804-01-00003
CR602	Diode, 1N4148	4803-01-00003
CR603	Diode, 1N4148	4803-01-00003
J601	Connector, Male	2115-01-00004
J602	Connector, Male	2115-01-00004
J603	Connector, Male	2115-01-00004
J604	Connector, Male	2115-01-00004
J604A	Connector, Male	2115-01-00004
J604B	Connector, Male	2115-01-00004
L601	Coil, 470uH	1802-01-00068
Q601	Transistor, MPS6512	4859-01-00008
Q602	Transistor, MPS6512	4859-01-00008
Q603	Transistor, MPS6512	4859-01-00008
Q604	Transistor, MPS3638	4848-01-00004
Q605	Transistor, MPS6512	4859-01-00008

ITEM	DESCRIPTION	PART NUMBER
Q606	Transistor, MPS-2925	4856-01-00001
R601	Resistor, 27K	4702-02-00181
R602	Resistor, 18K	4702-02-00177
R603	Resistor, 10K	4702-02-00171
R604	Resistor, 47K	4702-02-00187
R605	Resistor, 1K	4702-02-00147
R606	Resistor, 1K	4702-02-00147
R607	Resistor, 6.8K	4702-02-00167
R608	Resistor, 4.7K	4702-02-00163
R609	Resistor, 390K	4702-02-00209
R610	Resistor, 15K	4702-02-00175
R611	Resistor, 1K	4702-02-00147
R612	Resistor, 68K	4702-02-00191
MODULE #7, SQUELCH		
C701	Capacitor, Disc .001uF	1509-01-01019
C702	Capacitor, Disc .001uF	1509-01-01019
C703	Capacitor, Cer Red Cap .0047uF	1509-11-52009
C704	Capacitor, Fixed Tan 1.0uF	1539-01-00010
CR701	Diode, 1N277	4804-01-00003
CR702	Diode, 1N277	4804-01-00003
J701	Connector, Male	2115-01-00004
J702	Connector, Male	2115-01-00004
J703	Connector, Male	2115-01-00004
J704	Connector, Male	2115-01-00004
J704A	Connector, Male	2115-01-00004
J705	Connector, Male	2115-01-00004
Q701	Transistor, MPS2925	4856-01-00001
Q702	Transistor, MPS2925	4856-01-00001
R701	Resistor, 390K	4702-02-00209
R702	Resistor, 8.2K	4702-02-00169
R703	Resistor, 47K	4702-02-00187
MODULE #8, AUDIO		
C801	Capacitor, Fixed Tan. 3.3uF	1539-01-00009
C802	Capacitor, Fixed Tan. 10uF	1539-01-00008
C803	Capacitor, SM 560pF	1519-01-12005
C804	Capacitor, Fixed Tan. 100uF	1539-01-00023
C805	Capacitor, Fixed Tan .1uF	1539-01-00011
CR801	Diode, 1N277	4804-01-00003
J801	Connector, Male	2115-01-00004
J801A	Connector, Male	2115-01-00004

ITEM	DESCRIPTION	PART NUMBER
J802	Connector, Male	2115-01-00004
J803	Connector, Male	2115-01-00004
J804	Connector, Male	2115-01-00004
Q801	Transistor, MPS2925	4856-01-00001
Q802	Transistor, AMP 2N4126	4848-01-00005
Q803	Transistor, AMP 2N4106	4850-01-00002
Q804	Transistor, AMP 2N4105	4850-01-00001
R801	Resistor, 1/10W, 5% 82K	4701-01-01372
R802	Resistor, 12K	4702-02-00173
R803	Resistor, 1/10W, 5% 15K	4701-02-01354
R804	Resistor, 1/10W, 5% 2.7K	4701-02-01336
R805	Resistor, 33Ω	4702-02-00111
R806	Resistor, 1.2K	4702-02-00149
R807	Resistor, 6.8K	4702-02-00167
R808	Resistor, 2.2K	4702-02-00155

MODULE #9, PHASE MODULATOR

ITEM	DESCRIPTION	PART NUMBER
C901	Capacitor, Fixed Tan .10uF	1539-01-00010
C902	Capacitor, Cer Red Cap .0047uF	1509-11-52009
C903	Capacitor, Cer Red Cap 1800pF	1509-11-52005
C904	Capacitor, Fixed Tan .1uF	1539-01-00011
C905	Capacitor, Fixed Tan. .1uF	1539-01-00011
C906	Capacitor, Cer Red Cap 1800pF	1509-11-52005
C907	Capacitor, Fixed Tan 10.0uF	1539-01-00020
C908	Capacitor, Fixed Tan 3.3uF	1539-01-00009
C909	Capacitor, Fixed Paper 5% .047uF	1528-01-05000
C910	Capacitor, Cer Red Cap .01uF	1509-11-52011
C911	Capacitor, Fixed Tan 1.0uF	1539-01-00010
C912	Capacitor, Cer Red Cap .01uF	1509-11-52011
C913	Capacitor, Silver Mica 510pF	1519-01-12004
C914	Capacitor, Cer Red Cap 39pF	1509-14-32015
C915	Capacitor, Silver Mica 150pF	1519-01-12000
C916	Capacitor, Silver Mica 180pF	1519-01-12001
C917	Capacitor, Fixed Tan. 22.0uF	1539-01-00021
C918	Capacitor, Silver Mica 180pF	1519-01-12001
CR901	Diode, 1N4148	4803-01-00003
CR902	Diode, 1N4148	4803-01-00003
CR903	Diode, 1N714	4830-01-00001
J901	Connector, Male	2115-01-00004
J901A	Connector, Male	2115-01-00004
J901B	Connector, Male	2115-01-00004
J901C	Connector, Male	2115-01-00004
J902	Connector, Male	2115-01-00004

ITEM	DESCRIPTION	PART NUMBER
J903	Connector, Male	2115-01-00004
J903A	Connector, Male	2115-01-00004
J903B	Connector, Male	2115-01-00004
J904	Connector, Male	2115-01-00004
J904A	Connector, Male	2115-01-00004
L901	Choke, Fixed Molded 470uH	1802-01-00068
L902	Choke, Fixed Molded 82mH	1801-01-00010
L903	Choke, Fixed Molded 470uH	1802-01-00068
Q901	Transistor, MPS2925	4856-01-00001
Q902	Transistor, MPS2925	4856-01-00001
Q903	Transistor, MPS706	4859-01-00009
Q904	Transistor, MPS706	4859-01-00009
R901	Resistor, 27K	4702-02-00181
R902	Resistor, 27K	4702-02-00181
R903	Resistor, 330Ω	4702-02-00135
R904	Resistor, 10K	4702-02-00171
R905	Resistor, 5.6K	4702-02-00165
R906	Resistor, 390K	4702-02-00209
R907	Resistor, 15K	4702-02-00175
R908	Resistor, 390K	4702-02-00209
R909	Resistor, 390K	4702-02-00209
R910	Resistor, 330K	4702-02-00207
R911	Resistor, 330Ω	4702-02-00135
R912	Resistor, 10K	4702-02-00171
R913	Resistor, 2.2K	4702-02-00155
R914	Resistor, 2.2K	4702-02-00155
R915	Resistor, 15K	4702-02-00175
R916	Resistor, 270K	4702-02-00205
R917	Resistor, 3.3K	4702-02-00159
L904	Coil, Single Winding 4.7 uH	1805-01-00151

MODULE #10, 1st TRIPLER

ITEM	DESCRIPTION	PART NUMBER
C1001	Capacitor, Fixed Tan 10uF	1539-01-00007
C1002	Capacitor, Ceramic 68pF	1509-01-00600
C1003	Capacitor, Fixed Molded .82pF	1509-01-04106
C1004	Capacitor, Silver Mica 100pF	1519-01-11004
C1005	Capacitor, Silver Mica 150pF	1519-01-12000
C1006	Capacitor, Cer Red Cap .0047uF	1509-11-52009
J1001	Connector, Male	2115-01-00004
J1002	Connector, Male	2115-01-00004
J1003	Connector, Male	2115-01-00004
J1003A	Connector, Male	2115-01-00004
J1003B	Connector, Male	2115-01-00004

ITEM	DESCRIPTION	PART NUMBER
J1004	Connector, Male	2115-01-00004
L1001	Coil, Tap, .38-.70uH	1806-01-00171
L1002	Coil, Tap, .56-1.0uH	1806-01-00172
Q1001	Transistor, 40637	4859-01-00006
R1001	Resistor, 10K	4702-02-00171
R1002	Resistor, 1.8K	4702-02-00153
R1003	Resistor, 180Ω	4702-02-00129

MODULE #11, 2nd TRIPLER

ITEM	DESCRIPTION	PART NUMBER
C1101	Capacitor, Cer Red Cap 2200pF	1509-11-52006
C1102	Capacitor, Cer Red Cap 4700pF	1509-11-52009
C1103	Capacitor, Silver Mica 27pF	1519-01-11000
C1104	Capacitor, Fixed Molded .62pF	1509-01-04105
C1105	Capacitor, Silver Mica 30pF	1519-01-11001
C1106	Capacitor, Silver Mica 75pF	1519-01-11003
J1101	Connector, Male	2115-01-00004
J1102	Connector, Male	2115-01-00004
J1103	Connector, Male	2115-01-00004
J1103A	Connector, Male	2115-01-00004
J1104	Connector, Male	2115-01-00004
L1101	Coil, 1uH	1805-01-00143
L1102	Coil, .18-.24uH Tap	1806-01-00173
L1103	Coil, .20-.285uH	1806-01-00180
Q1101	Transistor, 40637	4859-01-00006
R1101	Resistor, 1/8W, 5% 47K	4729-01-00002
R1102	Resistor, 68Ω	4702-02-00119

MODULE #12, DOUBLE DRIVER

ITEM	DESCRIPTION	PART NUMBER
C1201	Capacitor, Cer Red Cap 4700pF	1509-11-52009
C1202	Capacitor, Cer Red Cap 4700pF	1509-11-52009
C1203	Capacitor, Cer Red Cap 4700pF	1509-11-52009
C1204	Capacitor, Cer Red Cap 10pF	1509-14-32008
C1205	Capacitor, Cer Red Cap 4700pF	1509-11-52009
C1206	Capacitor, Cer Red Cap 10pF	1509-14-32008
C1207	Capacitor, Cer Red Cap .001uF	1509-11-52003
C1208	Capacitor, Cer Red Cap 8pF	1509-14-32048
C1209	Capacitor, Cer Red Cap 47pF	1509-14-32016
J1201	Connector, Male	2115-01-00004
J1202	Connector, Male	2115-01-00004
J1202A	Connector, Male	2115-01-00004
J1203	Connector, Male	2115-01-00004
J1203A	Connector, Male	2115-01-00004

ITEM	DESCRIPTION	PART NUMBER
J1203B	Connector, Male	2115-01-00004
J1204	Connector, Male	2115-01-00004
L1201	Coil, .18uH	1806-01-00203
L1202	Coil, .18uH	1806-01-00203
L1203	Coil, CCW .14-.19uH Tap	1806-01-00181
L1204	Coil, .18uH	1806-01-00203
L1205	Coil, CW .14-.17uH Tap	1806-01-00179
Q1201	Transistor, 40637	4859-01-00006
Q1202	Transistor, 2N4427	4860-01-00004
R1201	Resistor, 120K	4702-02-00197
R1202	Resistor, 220Ω	4702-02-00131
R1203	Resistor, 100Ω	4702-02-00123

MODULE #13, R.F. FINAL

C1301	Capacitor, Cer Red Cap 4700pF	1509-11-52009
C1302	Capacitor, Cer Red Cap 15pF	1509-14-32010
C1303	Capacitor, Silver Mica 27 pF	1519-01-11000
C1304	Capacitor, Cer Red Cap 10pF	1509-14-32008
C1305	Capacitor, Cer Red Cap 10pF	1509-14-32008
J1301	Connector, Male	2115-01-00004
J1302	Connector, Male	2115-01-00004
J1303	Connector, Male	2115-01-00004
J1303A	Connector, Male	2115-01-00004
J1304	Connector, Male	2115-01-00004
L1301	Coil, .47uH	1806-01-00208
L1302	Coil, .18uH	1806-01-00203
L1303	Coil, .12-.18uH	1806-01-00175
L1304	Coil, .026-.035uH	1806-01-00174
Q1301	Transistor, 40290	4860-01-00005
R1301	Resistor, 150Ω	4702-02-00127

MODULE # 14, CURRENT LIMITER

C1401	Capacitor, Fixed Tan. 313uF	1539-01-00009
CR1401	Diode, 1N277	4804-01-00003
J1402	Connector, Male	2115-01-00004
J1403	Connector, Male	2115-01-00004
J1405	Connector, Male	2115-01-00004
J1405A	Connector, Male	2115-01-00004
Q1401	Transistor, 2N3638	4849-01-00001
R1401	Resistor, 4.7K	4702-02-00163
R1402	Resistor, Variable 2KΩ	4734-01-00027
R1403	Resistor, 1/2W, 5%, 1.5Ω	4703-02-00382

"F" OPTION, 4 WATT FIELD INSTALLATION

The "F" Option, 4 Watt Field Installation Kit allows the radio operator four watts of output. Radios may be ordered with the "F" option or a modification kit is available for field installation.

The field installation is accomplished by removing the existing module #13 and replacing it with the new 4 watt module #13.

When a field modification is made a new unit nameplate, "DH300H", must be inserted into the front panel, replacing the existing "DH300" nameplate.

Note: Nameplates are backed with a solvent activated adhesive. To activate the adhesive, use the following procedure:

1) Peal off the protective paper cover.
2) Wipe adhesive with trichlorethylene or equivalent.
3) Allow adhesive to become tacky.
4) Press into position.

PARTS LIST

DESCRIPTION	PART NUMBER
R.F. Final, 4 Watt Module #13	9013-01-00021
Label, DH300H	2416-01-00050

NOTE: When converting from a DH300 to a DH300H, FCC requires a new identification label indicating "DH300H".
Label may be purchased from manufacture........P/N 2416-01-00043.

SECTION XII DH300M

MARITIME, LOW POWER FIELD INSTALLATION KIT

The Maritime, Low Power Field Installation Kit allows the radio operator a selection of either the standard 2.2 watt output or the special 1 watt output. Radios may be ordered with the Maritime Option or a modification kit is available for field installation.

A dual push-to-talk button is provided for a fast switching capability. The addition of two microswitches, one power resistor, relocation of one inductor and minor rewiring is all that is required for modification in the field.

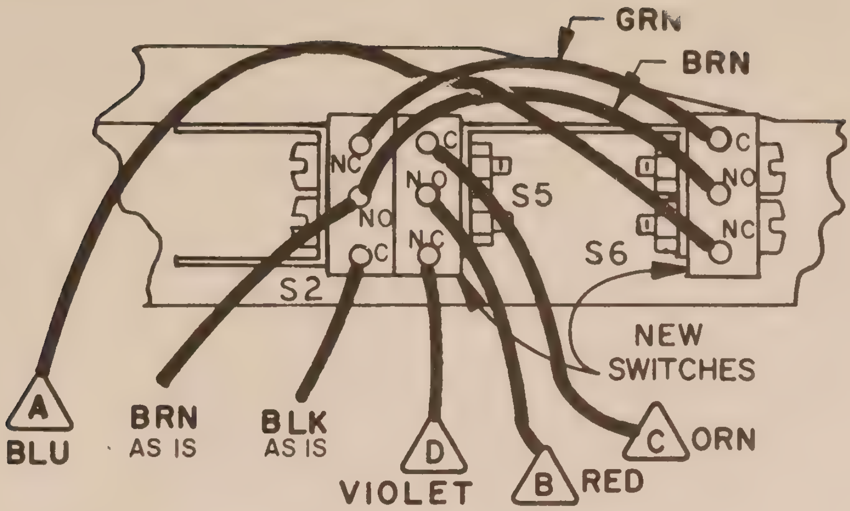
When a field modification is made, new "Frequency" and "Maritime" labels must be added to the back panel replacing the existing labels. The "Frequency" label must contain all original frequency data and appropriate FCC Type Number. Also a new unit nameplate, "DH300M", must be added to the front panel, replacing the existing "DH300" label.

Note: Nameplates and labels have a solvent activated adhesive backing. To activate the adhesive, use the following Procedure:

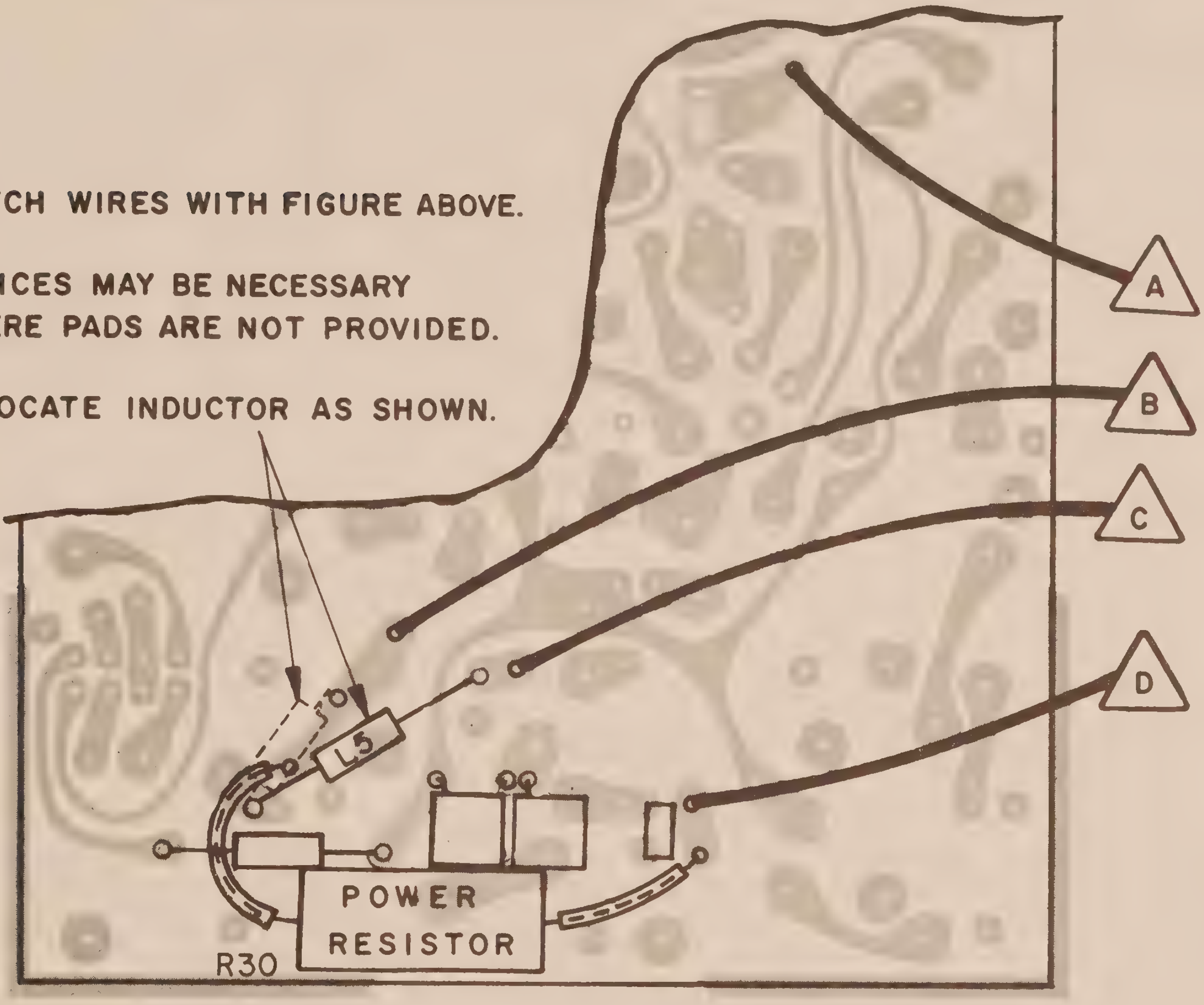
1) Peal off the protective paper cover.
2) Wipe adhesive with trichlorethylene or equivalent.
3) Allow adhesive to become tacky.
4) Press into position.

PARTS LIST

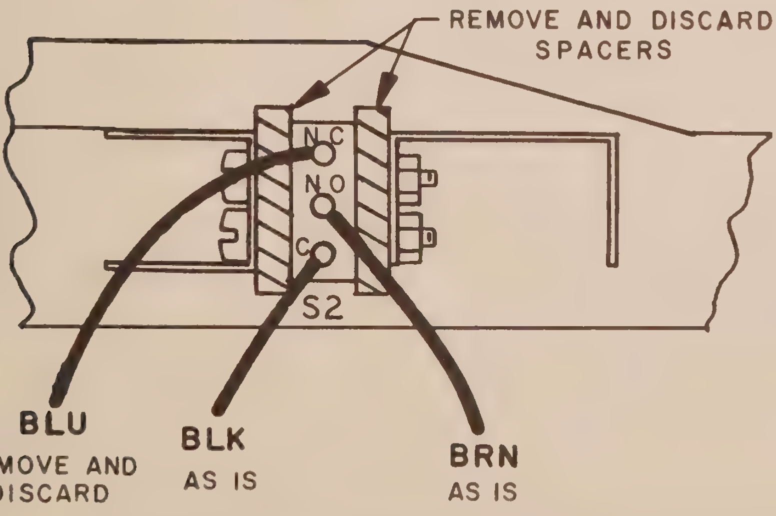
Item	Description	Part Number
R30	Resistor, 33Ω, 2W, Wire Wound	4713-01-02002
S5	Switch, SPDT Snap Acting	5126-01-00002
S6	Switch, SPDT Snap Acting	5126-01-00002
	Actuator, Switch, Low Power	2501-01-00006
	Label, Maritime	2416-01-00049
	Label, Frequency	2416-01-00043
	Screw, Phillips Rd.H. #2-56 x 5/16	2810-51-02110
	Nut, #2-56	2893-51-02100
	Int. Tooth L'washer #2	2898-51-31004
	Wire, #24, Blue 3"	6006-01-01366
	Wire, #24, Orange 3"	6006-01-01333
	Wire, #24, Violet 3"	6006-01-01377
	Wire, #24, Red 3"	6006-01-01322
	Wire, #24, Green 2"	6006-01-01355
	Wire, #24, Brown 2"	6006-01-01311
	Label, DH300M	2416-01-00051



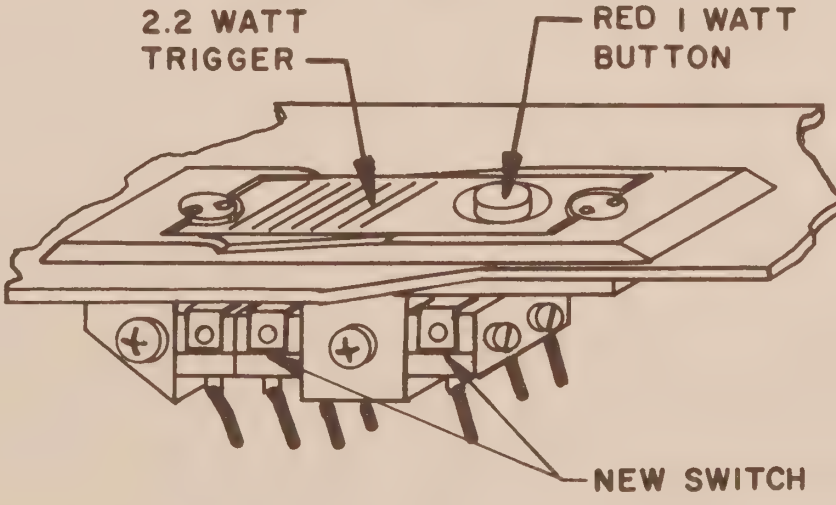
WIRING MODIFICATION



1. MATCH WIRES WITH FIGURE ABOVE.
2. SPLICES MAY BE NECESSARY WHERE PADS ARE NOT PROVIDED.
3. RELOCATE INDUCTOR AS SHOWN.



ORIGINAL INSTALLATION



* PH 300 MODULES

CROSS REFERENCED TO HH 300

		**		Factory Sales		
Description	Freq.	H Number	Repco No.	Min.	Max.	West Coast
R. F. Amp.	132	9013-1-24	901-061	5	10	2
R. F. Amp.	150	9013-1- 5	901-071	25	50	10
R. F. Amp.	162	9013-1-31	901-081	15	25	2
First Mixer		9013-1- 6	902-181	25	50	5
First Oscill.		9013-1- 7	903-681	25	50	5
Second Mix/Osc.		9013-1- 8	904-181	25	50	5
Second IF		9013-1- 9	905-181	25	50	5
Discriminator		9013-1-10	906-181	25	50	5
Squelch		9013-1-11	907-181	35	75	10
Receive Audio		9013-1-12	908-181	50	100	10
Modulator		9013-1-13	909-681	50	100	10
First Tripler	132	9013-1-25	910-062	5	10	2
First Tripler		9013-1-14	910-781	25	50	5
Second Tripler	132	9013-1-26	911-062	5	10	2
Second Tripler		9013-1-15	911-781	25	50	5
Driver	132	9013-1-27	912-062	5	10	2
Driver	150	9013-1-16	912-071	25	50	5
Driver	162	9013-1-28	912-081	15	25	2
R. F. Final	132	9013-1-29	913-062	5	10	2
R. F. Final		9013-1-17	913-781	50	100	10
Limiter		9013-1-18	914-182	25	50	5

4 Watt Transmitter

R. F. Final	150	9013-1-21	913-072	25	50	5
R. F. Final	162	9013-1-30	913-081	25	50	5

Popular Parts

Relay		4516-1- 1	45-01-002	25	50	5
Pot. Vol. Off		4735-1-8003	47-08-005	50	100	15
Pot. Squelch		4735-1-19	47-08-004	25	50	5
Speakers		1310-1-23	13-03-003C	50	100	15
Toggle Sw		5102-1-11	51-01-008	25	50	5
Micro Switch		5126-1- 2	51-11-002	15	25	2
Tel. Antenna		9013-3- 1	810-164-01	35	75	10
Main P.C. Bd.		1731-1- 2	710-004-02	15	25	1
Mike		TBA	13-04-001	15	25	2
Battery		9013-1-19	810-156-1	25	75	5

* Cross Referenced to HH-300

** Please Note "0" numbers have been deleted for internal use only.

* PH 300 MODULES

CROSS REFERENCED TO HH 300

		**		Factory Sales		
Description	Freq.	H Number	Repco No.	Min.	Max.	West Coast
R. F. Amp.	132	9013-1-24	901-061	5	10	2
R. F. Amp.	150	9013-1- 5	901-071	25	50	10
R. F. Amp.	162	9013-1-31	901-081	15	25	2
First Mixer		9013-1- 6	902-181	25	50	5
First Oscill.		9013-1- 7	903-681	25	50	5
Second Mix/Osc.		9013-1- 8	904-181	25	50	5
Second IF		9013-1- 9	905-181	25	50	5
Discriminator		9013-1-10	906-181	25	50	5
Squelch		9013-1-11	907-181	35	75	10
Receive Audio		9013-1-12	908-181	50	100	10
Modulator		9013-1-13	909-681	50	100	10
First Tripler	132	9013-1-25	910-062	5	10	2
First Tripler		9013-1-14	910-781	25	50	5
Second Tripler	132	9013-1-26	911-062	5	10	2
Second Tripler		9013-1-15	911-781	25	50	5
Driver	132	9013-1-27	912-062	5	10	2
Driver	150	9013-1-16	912-071	25	50	5
Driver	162	9013-1-28	912-081	15	25	2
R. F. Final	132	9013-1-29	913-062	5	10	2
R. F. Final		9013-1-17	913-781	50	100	10
Limiter		9013-1-18	914-182	25	50	5

4 Watt Transmitter

R. F. Final	150	9013-1-21	913-072	25	50	5
R. F. Final	162	9013-1-30	913-081	25	50	5

Popular Parts

Relay	4516-1- 1	45-01-002	25	50	5
Pot. Vol. Off	4735-1-8003	47-08-005	50	100	15
Pot. Squelch	4735-1-19	47-08-004	25	50	5
Speakers	1310-1-23	13-03-003C	50	100	15
Toggle Sw	5102-1-11	51-01-008	25	50	5
Micro Switch	5126-1- 2	51-11-002	15	25	2
Tel. Antenna	9013-3- 1	810-164-01	35	75	10
Main P.C. Bd.	1731-1- 2	710-004-02	15	25	1
Mike	TBA	13-04-001	15	25	2
Battery	9013-1-19	810-156-1	25	75	5

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* Cross Referenced to HH-300

** Please Note "0" numbers have been deleted for internal use only.

CAPACITORS:

REPCO	HAMMARLUND	DESCRIPTION
15-01-006	1509-14-32012	Capacitor, Cer. 22pF
15-01-043	1509-11-52011	Capacitor, Cer. .01uF
15-01-007	1509-01-01086	Capacitor, Cer. .05uF
15-01-033	1509-11-52006	Capacitor, Cer. .0022uF
15-01-042	1509-11-52009	Capacitor, Cer. .0047uF
15-01-044	1509-01-01088	Capacitor, Cer. .1uF
15-01-020	1509-14-32008	Capacitor, Cer. 10pF
15-01-038	1509-14-32047	Capacitor, 5pF
15-01-039	1513-01-00024	Capacitor, Var. 7-35pF
15-01-045	1513-01-00022	Capacitor, Var. 6-22pF
15-01-066		Capacitor, Var. 2-81pF
15-03-009	1539-01-00009	Capacitor, Tan. 3.3uF
15-03-016	1539-01-00010	Capacitor, Tan. 1uF, 25V
15-01-041	1509-01-01019	Capacitor, Cer. .001uF
15-03-026	1539-01-00022	Capacitor, Tan. 33uF
15-03-024		Capacitor, Tan. 82uF, 2V
15-03-012	1539-01-00021	Capacitor, Tan. 22uF, 15V
15-03-020		Capacitor, Tan. 6.8uF, 4V
15-03-014	1539-01-00022	Capacitor, Tan. .33uF, 25V
15-03-023	1509-11-62015	Capacitor, Tan. .033uF, 20V

176-006 trigger guard for P/T switch

[illegible]

REPCO	[illegible]	DESCRIPTION
21-01-001	2109-01-00013	Phone, jack
21-04-001	2115-01-00004	Connector, Speaker pin plug
21-05-003	2116-01-00008	Socket, Speaker
21-14-006	Used on Mike Option	Connector Plug
21-23-004	2888-51-00014	Lug, terminal grounded
21-23-007	2888-26-01000	Lug, terminal grounded
23-09-002	2305-01-00096	Crystal, 2nd. Oscillator
23-10-006	2304-01-00029	Crystal, Transm.
23-10-007	2305-01-00097	Crystal, Rec.
28-04-002	2898-51-91033	Washer, Spring locklever
32-01-001	6067-01-00002	Strap, plastic (cable tie)
45-01-002	4516-01-00001	Relay
47-02-004	4713-01-02002	Resistor, 33Ω wirewound
47-08-004	4735-01-00019	Potentiometer, Squelch
47-08-005	4735-01-08003	Potentiometer w/switch (off-v-o
51-11-002	5126-01-00002	Switch, Submin. SPDT
510-039-01	2416-01-00041	Label, FCC
510-042-01	* no cross ref. (see note)	Seal, Knob
510-043-01	2515-01-00023	Seal Case Back
510-043-02	2515-01-00023	Seal Case Front
510-044-01	3124-01-00012	Seal Tone Monitor
510-044-02	3124-01-00011	Seal, PTT
510-049-02	3124-01-00101	Boot, moisture
510-071-01	1458-01-00001	Case, radio, black plastic
510-098-02	3123-01-00050	Gasket, Speaker
510-099-01	2897-54-00613	Nut, mtg. 1/4 x 32
510-100-01	5107-01-00011	Switch, rotary 5 position
510-115-01	Made up by:	Indicator Strip
	2416-01-00037	Label, Antenna
	2416-01-00053	2 Ch. Label
	2416-01-00038	Label, Fone
	2416-01-00039	Label, Off-V-On
	2416-01-00040	Label, Squelch
510-124-01	3124-01-00104	Seal, Bushing
510-230-01	3123-01-00050	Gasket, speaker

NOTE: Repco's knob and knob seal are replaced by:

Knob Insert	3124-01-00100
Knob	2430-01-00004

There is no cross reference.

RESISTORS

REPCO	HAMMARLUND	DESCRIPTION
RC07GF104K	4702-01-00056	Res. 100K, 10%, 1/4W
RC07GF333J	4702-02-00183	Res. 33K 5%, 1/4W
RC07GF392K	4702-01-00039	Res. 3.9K, 10%, 1/4W
RC07GF680K	4702-01-00018	Res. 68Ω, 10%, 1/4W
RC07GF822K	4702-01-00043	Res. 8.2K, 10%, 1/4W
RC07GF123J	4702-02-00173	Res. 12K, 5%, 1/4W
RC07GF681K	4702-01-00030	Res. 680Ω, 10%, 1/4W
RC07GF823J	4702-02-00193	Res. 82K,5%, 1/4W
RC07GF393J	4702-02-00185	Res. 39K, 5%. 1/4W
RC07GF272J	4702-02-00157	Res. 2.7K, 5%, 1/4W
RC07GF470J	4702-02-00115	Res. 47Ω,5%, 1/4W
RC07GF332J	4702-02-00159	Res. 3.3K,5%, 1/4W
47-08-007		Res. 25K, Var.
RC07GF682K	4702-01-00042	Res. 6.8K, 10%, 1/4W
RC07GF473K	4702-01-00052	Res. 47K, 10%, 1/4W
RC07GF683K	4702-01-00054	Res. 68K, 10%, 1/4W
RC07GF273K	4702-01-00049	Res. 27K, 10%, 1/4W
RC07GF823K	4702-01-00055	Res. 82K, 10%, 1/4W
RC07GF223K	4702-01-00048	Res. 22K, 10%, 1/4W
RC07GF394K	4702-01-00063	Res. 390K, 10%, 1/4W
RC07GF154J	4702-02-00199	Res. 150K, 5%, 1/4W
RC07GF184J	4702-02-00201	Res. 180K, 5%, 1/4W
RC07GF683J	4702-02-00191	Res. 68K, 5%, 1/4W
RC07GF471K	4702-01-00028	Res. 470Ω, 10%, 1/4W
RC07GF271K	4702-01-00025	Res. 270Ω, 10%, 1/4W
RC07GF680J	4702-02-00119	Res. 68Ω, 1/4W
47-08-006 ✓	4734-01-00027	Res. 2KΩ, Var.
RC05GF822K	4729-01-00001	Res. 8200Ω, 1/8W
47-04-001 ✓	4746-01-00003	Thermistor, 100Ω
RC07GF181K	4702-02-00129	Resistor, 180Ω, 1/4W
47-02-004	4713-01-02002	Resistor, 33Ω wirewound

REPCO	HAMMARLUND	DESCRIPTION
48-06-001	4804-01-00003	Diode, Ger. 1N[illegible]
48-05-011	4803-01-00003	Diode, Sil. 1N4148

INDUCTORS

REPCO	HAMMARLUND	DESCRIPTION
18-02-002		Inductor, 10H
18-01-037	1804-01-00120	10uH Molded Choke
18-01-036	1805-02-00137	4.7uH Molded Choke
18-01-004	1805-01-00143	1.0uH Molded Choke
18-01-032	1806-01-00200	.1uH Molded Choke
18-01-038	1802-01-00068	470uH Molded Choke
18-01-004	1805-01-00143	Inductor, 1.0uH
18-01-048	1806-01-00211	Inductor, .82uH

TRANSFORMERS

REPCO	HAMMARLUND	DESCRIPTION
48-01-005	4856-01-00001	Transformer,NPN Sil, MPS292

[illegible]

REPCO	HAMMARLUND	DESCRIPTION
901-[illegible] 071	9013-01-00005	Module, RF Amplifier (1)
902-181	9013-01-00006	Module, 1st. Mixer (2)
903-681	9013-01-00007	Module, 1st. Oscillator(3)
904-181	9013-01-00008	Module, 2nd. Mixer (4)
905-181	9013-01-00009	Module, Second I.F.(5)
906-181	9013-01-00010	Module, Discriminator (6)
907-181	9013-01-00011	Module, Squelch(7)
908-181	9013-01-00012	Module, Receive(8)
909-681	9013-01-00013	Module, Modulator (9)
910-062	9013-01-00014	Module, 1st. Tripler(10)
911-062	9013-01-00015	Module, 2nd. Tripler(11)
912-062	9013-01-00016	Module, Driver (12)
913-062	9013-01-00017	Module, RF Final(13)
914-182	9013-01-00018	Module, Current Limiter(14)

MARITIME OPTION

REPCO	HAMMARLUND	DESCRIPTION
510-045-02	2501-01-00006	Pin, monitor
510-073-01	2501-01-00004	Trigger, PTT
80-31-004	2810-51-02110	Screw, #2-56 x 5/16
90-10-006	2893-51-02100	Nut
510-232-01	2416-01-00049	Maritime Label
510-035-02	2416-01-00043	Frequency Label

MODU

MODU

MO

[illegible]

[illegible]	HAMMARLUND	DESCRIPTION
901-[illegible] 071	9013-01-00005	Module, RF Amplifier (1)
902-181	9013-01-00006	Module, 1st. Mixer (2)
903-681	9013-01-00007	Module, 1st. Oscillator (3)
904-181	9013-01-00008	Module, 2nd. Mixer (4)
905-181	9013-01-00009	Module, Second I.F. (5)
906-181	9013-01-00010	Module, Discriminator (6)
907-181	9013-01-00011	Module, Squelch (7)
908-181	9013-01-00012	Module, Receive (8)
909-681	9013-01-00013	Module, Modulator (9)
910-062	9013-01-00014	Module, 1st. Tripler (10)
911-062	9013-01-00015	Module, 2nd. Tripler (11)
912-062	9013-01-00016	Module, Driver (12)
913-062	9013-01-00017	Module, RF Final (13)
914-182	9013-01-00018	Module, Current Limiter (14)

MARITIME OPTION

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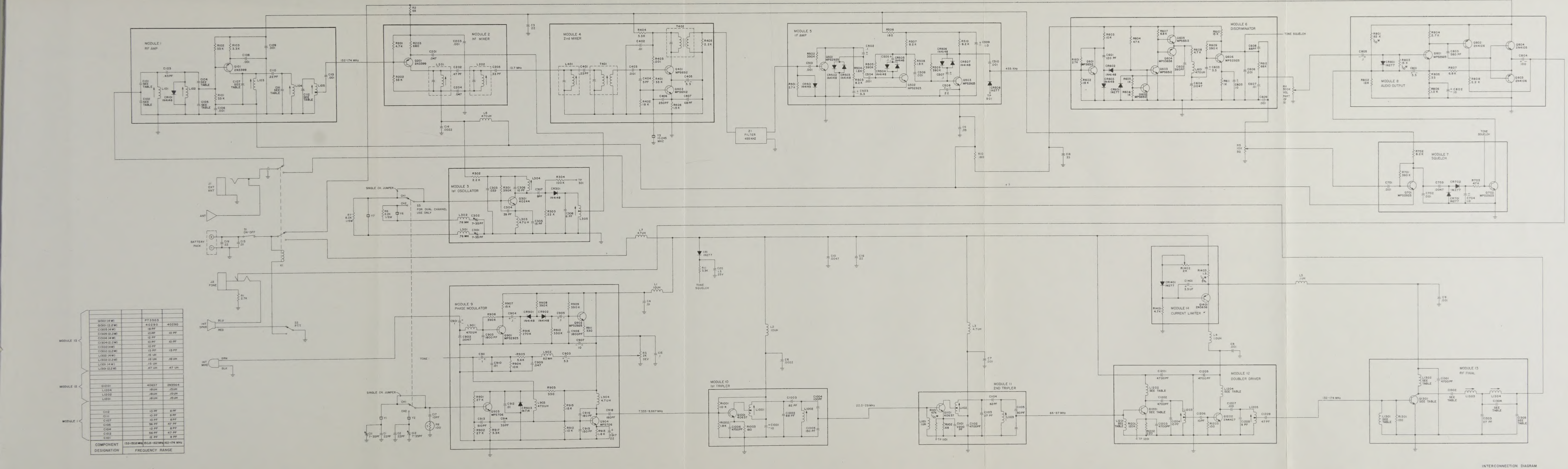

	COMPONENT DESIGNATION	FREQUENCY RANGE 132-150.8 MHz	150.8-162 MHz	162-174 MHz
MODULE 13	Q1301 (4 W)		PT3503	
	Q1301 (2.2 W)		40290	40290
	C1305 (4 W)		18 PF	
	C1305 (2.2 W)		10 PF	10 PF
	C1304 (4 W)		12 PF	
	C1304 (2.2 W)		10 PF	10 PF
	C1302 (4 W)		10 PF	
	C1302 (2.2 W)		15 PF	15 PF
	L1302 (4 W)		.15 UH	
	L1302 (2.2 W)		.18 UH	.18 UH
	L1301 (4 W)		.15 UH	
	L1301 (2.2 W)		.47 UH	.47 UH
MODULE 12	Q1201		40637	2N3564
	L1204		.18UH	.15UH
	L1202		.18UH	.15UH
	L1201		.18UH	.15UH
MODULE 1	C112		10 PF	8 PF
	C111		10 PF	8 PF
	C107		10 PF	8 PF
	C105		56 PF	47 PF
	C104		12 PF	8 PF
	C102		56 PF	47 PF
	C101		12 PF	8 PF

INTERCONNECTION DIAGRAM
FIGURE 7

THE HAMMARLUND MANUFACTURING COMPANY INCORPORATED

Standard Warranty

The Hammarlund Manufacturing Company, warrants this equipment to be free from defects in workmanship and materials under normal and proper use and service for the uses and purposes for which it is designed, and agrees to repair or replace, without charge, all parts thereof showing such defects which are returned for inspection to the Company's factory, transportation prepaid, within a period of 90 days from date of delivery, provided such inspection discloses to the satisfaction of the Company that the defects are as claimed, and provided also, that the equipment has not been altered, repaired, subjected to misuse, negligence or accident, or damaged by lightning, excessive current or otherwise, or had its serial number or any part thereof altered, defaced, or removed. Tubes shall be deemed to be covered by the manufacturers standard warranty applicable thereto, and such items shall be and are hereby excluded from the provisions of this warranty. Pilot lamps and fuses are not guaranteed for length of service.

Except as herein specifically provided, no warranty, express or implied, other than that of title, shall apply to any equipment sold hereunder. In no event shall the Company be liable for damages by reason of the failure of the equipment to function properly or for any consequential damages.

This warranty is valid for the original owner of the equipment. No equipment shall be returned to the factory for repairs under warranty unless written authorization is obtained from the Company, and the equipment is shipped prepaid by the owner. The Company maintains Authorized Service Stations, names and locations of which will be sent upon request of the owner.

With regard to FM Communications equipment, the performance of equipment and the liability of the Company under this warranty provision is contingent upon a systematic program of routine maintenance by a qualified communications technician, holding a first or second class Radio Telephone or Telegraph operators license in accordance with FCC regulations. The nature of electronic communication equipment is such that routine maintenance by a qualified technician is essential to reliable operation and minimized maintenance costs.

THE HAMMARLUND MANUFACTURING COMPANY INCORPORATED
20 Bridge Avenue, Red Bank, New Jersey 07701
a subsidiary of Electronic Assistance Corporation

The policy of the Hammarlund Manufacturing Company is one of continued improvement in design and manufacture wherever possible, to provide the highest attainable quality and performance. Hence, specifications finishes, etc. are subject to change without notice and without assumption by Hammarlund of any obligation or responsibility to provide such features as may be changed, added or dropped from previous production runs of this equipment.

DO NOT MAKE ANY RETURNS WITHOUT AUTHORIZATION FROM THE FACTORY. ALL AUTHORIZED RETURNS SHOULD BE SHIPPED TO THE HAMMARLUND MANUFACTURING COMPANY INCORPORATED, ATTN: CUSTOMER SERVICE, Red Bank, New Jersey 07701